



aperam
made for life

Our stainless
steel roofing offer

performan



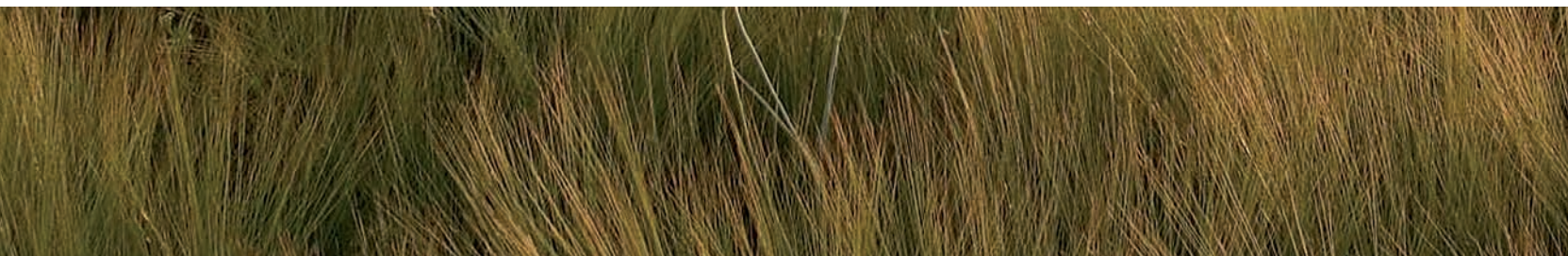
Aperam is a global stainless steel player offering a multitude of effective, innovative and environmentally friendly stainless steel solutions, tailored to meet our customer expectations.

Aperam stainless: a different choice.

We anticipate end-users' new requirements and we **support** every customer, from technical assistance to product co-development, thanks to our global presence.

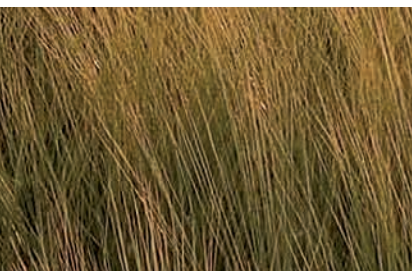
We offer **the most comprehensive and innovative range** of stainless steel solutions in the market in order to satisfy the wide variety of expectations: A stainless solution tailor-made for each customer.

We enjoy **recognised and long-standing expertise** among the players in the construction sector, including project managers, developers, architects and main contractors.





Photos on cover and on page opposite:
Zentrum Paul Klee - Berne - Switzerland.
Renzo Piano Building Workshop
in collaboration with ARB (Berne)
© RPBW - Michel Denancé
Executed using grades 316L
and 304 with UGITOP finish



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and stainless steel

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Stainless steel, the material for sustainable development

Stainless steel is the "green material" par excellence and is infinitely recyclable. Within the construction sector, its actual recovery rate is close to 100%. It is environmentally neutral and inert when in contact with elements such as water, it does not leach compounds that might modify their composition.

These qualities make it a material which is ideally suited to building applications exposed to adverse weather: roofs, facades, rainwater recovery systems and domestic water pipes. Stainless steel's longevity fulfils the requirements of sustainable construction: effective selection, installation and low maintenance guarantee the user unrivalled service life.

Stainless steel, a combination of performance and aesthetics for your projects

Design

For roofing applications, our stainless steels offer ease of processing and installation in long lengths, as well as a low weight per square meter, ease of soldering and good performance at low temperatures.

Stainless steel has excellent mechanical properties and is resistant to corrosion and fire.

Economic performance


Designing and building with stainless steel guarantees a positive relationship between the final cost and the structure's lifecycle.

Price stability, particularly with our ferritic grades, and cost levels comparable with other metals traditionally used in roofing, make stainless steel a very competitive choice.

Aesthetics

Stainless steel permits a freedom of creativity and architectural design second to none. Our stainless steels enable the achievement of complex forms and combine well with other materials such as glass, wood, stone.

Our solutions offer you a wide selection of surface finishes for roofing: UGINOX FTE/FME/AME, UGITOP, UGIBRIGHT and UGIBAT.



Temis Innovation,
Maison des microtechniques, Besançon - France
Project Manager: Lamboley Architectes Office
© Nicolas Waltefaugle
Executed using grade 304 with UGIBRIGHT finish

service

Over and above the roofing product offer described in this brochure, it is the way in which we support you throughout your projects that differentiates us from other producers.

Technical Partnership

From the purchase decision to the execution of your projects, our **technical expertise** is at your disposal.

Because the quality of your products depends on the use to which you put them, the exposure and environment to which they are subjected, and the potential that you wish to exploit, our engineers provide advice to developers, project managers and contractors.

Our **"Stainless Workshops"** – operational workshops located at our Isbergues site – can train your colleagues and operatives in the use of stainless steel. Our experts in various European countries provide training in schools of architecture and design, in high schools and vocational schools specialising in roofing.

We collaborated with the Centre Scientifique et Technique du Bâtiment⁽¹⁾ in the preparation of **technical document 40.44** "Using blanks and sheets in Stainless steel roofing". This document outlines the technical rules to be observed in construction, renovation and rehabilitation work.

Product Innovation

Stainless Europe has a highly competent research centre dedicated to Stainless steel, but can also call upon the services of all Aperam research facilities.

We are working in conjunction with materials manufacturers to enhance the performance of our steels by combining them with other materials, such as glass..

Logistic offer

Our dedicated European logistics platform located in Isbergues ensures a service level adapted to your requirements.

Our stainless steel range for roofing is available from stock, in standard formats, to order and made to measure products.

A team of logistic experts dedicated to quality of service and on time delivery is at your disposal.

Proximity to our Customer

Stainless Europe also has the advantage of its sales network – 16 Service Centres and sales offices throughout Europe, which offer a quality service and proximity to those involved in the construction sector.

You will find the relevant contact information on the back cover.

⁽¹⁾ Construction Industry Scientific and Technical Centre, an official standardisation and certification body.

What is stainless steel?

Steel is an alloy of iron and carbon.

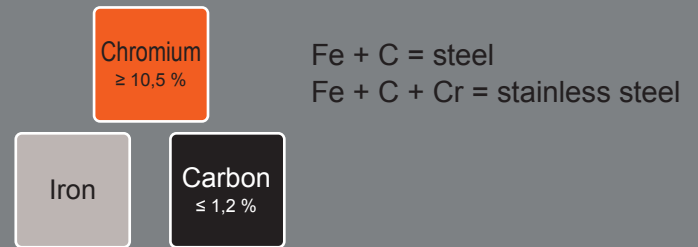
Stainless steels are steels containing less than 1.2% carbon and at least 10.5% chromium, and other alloying elements.

The chromium content provides stainless steel with its corrosion resistance, enabling the natural and continuous development of a chromium oxide surface layer.

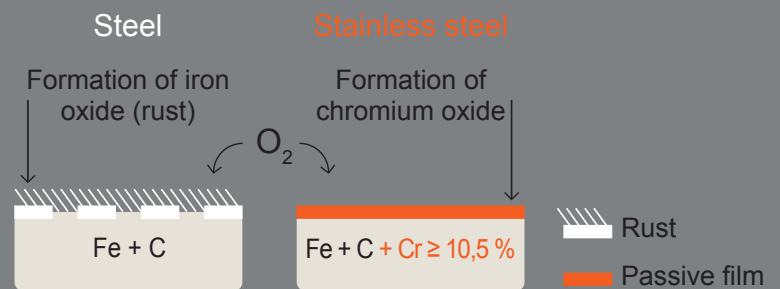
This oxide, referred to as the "passivation layer", provides it with lasting protection against all types of corrosion. This passivation layer is naturally self-healing when in contact with humidity or water.

Stainless steels' corrosion resistance and mechanical properties can be further enhanced by the addition of other elements such as nickel, molybdenum, titanium, niobium, manganese, etc.

Composition of stainless steels



Reaction of steel and stainless steel in contact with air humidity or water



The various categories of stainless steel suitable for roofing

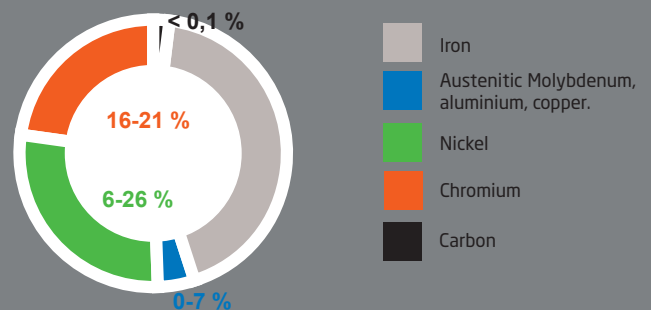
The stainless steels that are traditionally used for roofing can be grouped into two major categories.

KARA
key for value

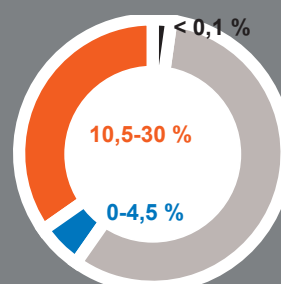
KARA is the Aperam brand for ferritic stainless steels. Unlike other stainless steels, the KARA range does not contain nickel and is thus immune from the erratic price fluctuations of this alloying element.

Prices are more stable over time: a strong argument in the construction sector, where project costing and economic design are key elements.

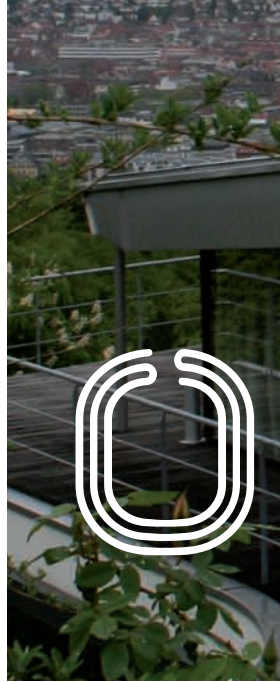
Austenitic S300



Ferritic S400: our KARA ferritic stainless steel solutions



select



An extensive choice of surface finishes

In order to meet the needs of all styles of architecture, we offer you a comprehensive range of surface finishes, from matt to bright, which can be achieved on various grades of stainless steels. All that is required is to identify the grade of stainless steel and the surface finish.

A grade of stainless steel

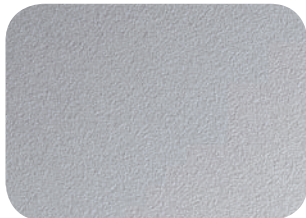
Corresponds to a steel product characterised by its chemical composition.

This composition has a direct influence on its resistance to corrosion and its mechanical properties.

Surface finishes

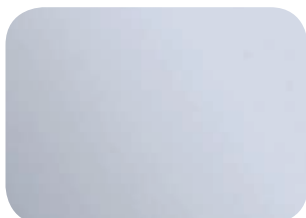
They are the result of mechanical or physico-chemical treatment of the surface of the steel.

Surface finishes can be reproduced on different grades of stainless steel.



UGITOP

This surface finish is characterised from installation by a permanent and durable matt finish. It blends into all types of environment, both rural and urban, traditional or modern, and is suited to all styles of architecture. This finish is easy to solder.



UGIBRIGHT

This is characterised by a particularly bright and uniform surface. Its smooth surface lends it self to both light and form.



UGIBAT

This uniform dull surface enables the accomplishment of very elegant, aesthetic projects.

These three surface finishes can be installed for both envelope applications, roofing and façade. They can be worked at low winter temperatures.

Our recommendation

It is important that the surface finish be compatible with the environment in which it is to be used.

For any given grade, low surface roughness finishes such as UGIBRIGHT provide a smooth surface, the most corrosion resistant as they are less susceptible to retaining contaminants and easier to clean.

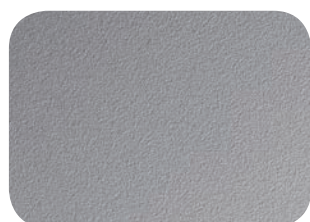


House Feuerbacher, Stuttgart - Germany
Architect: Günther Schaller / Behnisch & Partner.
Executed using grade 304 with UGITOP finish

Our tinned offer

Our UGINOX tinned range comprises austenitic or ferritic steels with an electro-tinned coating on both side. These grades weather over time, imparting a changing character and a matt finish that are highly prized for roofing. The tin tones down the stainless steel's natural lustre, enabling it to blend into all environments, while retaining its stainless properties.

UGINOX FTE/FME/AME



- > UGINOX FTE⁽¹⁾ is produced in K41 ferritic grade.
- > UGINOX FME⁽²⁾ is produced in K44 ferritic grade.
- > UGINOX AME⁽³⁾ is produced in 316L austenitic grade.

These products are easy to solder and can be worked at low winter temperatures. The UGINOX range is adapted to all atmospheric conditions including the most severe..

(1) FTE: tinned ferritic with titanium

(2) FME: tinned ferritic with molybdenum

(3) AME: tinned austenitic with molybdenum

Our recommendation

Our roofing range is suitable for standing seam, self supporting and cleated seam roofing as well as for roofing accessories. However, we do not recommend the use of tinned stainless steel for vertical fascias or roofing soffits.

Our stainless steel roofing solutions: reference table

The table below gives general information on our roofing offer. To confirm your choice or for help in formulating it together, nothing can surpass direct discussion with one of our experts: don't hesitate to contact us.

Commercial designations		Standards			Chemical compositions (typical values)						
		ASTM		EN							
		Désignations									
		TYPE	UNS		C	Si	Mn	Cr	Mo	Ni	Other
Stainless offer available in the following surface finishes: UGITOP, UGIBRIGHT, UGIBAT											
Austenitics	304	304	S30400	1.4301	0.05	0.40	1.10	18.15		8.05	
	316L	316L	S31603	1.4404	0.02	0.40	1.25	16.70	2.05	10.05	
Tinned stainless offer											
Tinned austenitic UGINOX AME	UGINOX AME 316L	316L	S31603	1.4404	0.02	0.40	1.25	16.70	2.05	10.05	
Tinned ferritics UGINOX FTE/FME	UGINOX FTE K41	441 ⁽¹⁾	S43932 S43940	1.4509	0.014	0.60	0.30	17.60			Ti + Nb = 0.55
	UGINOX FME K44	444	S44400	1.4521	0.016	0.40	0.30	17.75	1.85		Ti + Nb = 0.50

(1) Current designation.

Selection criteria for stainless steels

Grade Selector depending on atmospheric conditions

The choice of stainless steel grade for a roofing application must take into account the environment in which the material will be used. Our experts will help you in the selection.

Commercial designations		Standards			External environment					
		ASTM		EN	Un-polluted rural	Urban and industrial		Marine		
		Désignations				Normal	Severe ⁽²⁾	20 to 10 km	10 to 3 km	Coastal (<3 km)
		TYPE	UNS							
Stainless offer UGITOP, UGIBRIGHT et UGIBAT										
Austenitics	304	304	S30400	1.4301	✓	✓	▲	✓	✗	✗
	316L	316L	S31603	1.4404	✓	✓	▲	✓	▲	▲
Tinned stainless offer UGINOX ferritics										
Tinned austenitic UGINOX AME	UGINOX AME 316L	316L	S31603	1.4404	✓	✓	▲	✓	▲	▲
Tinned ferritics UGINOX FTE/ FME	UGINOX FTE K41	441 ⁽¹⁾	S43932 S43940	1.4509	✓	✓	▲	✗	✗	✗
	UGINOX FME K44	444	S44400	1.4521	✓	✓	▲	✓	▲	▲

✓ : Type suited to the environment ▲ : Type whose selection will be determined after consulting us ✗ : Type not suited to the environment
 (1) Current designation - (2) In particular, any environment or atmosphere containing corrosive substances or halogens: chlorides, fluorides, etc.

To ensure the longevity of the building, we advise that you to follow the standard cleaning regimes. For further information, consult us.

Stainless Steel - the material of choice for roofing

This table compares the characteristics of the principle materials used in roofing, and guides your selection, taking account of your constraints.

Properties (typical values)	UGITOP, UGIBRIGHT, UGIBAT		UGINOX Tinned			Zinc Cu - Ti ⁽¹⁾	Copper DHP Cu-b1 1/4 hard ⁽¹⁾	Aluminium EN AW 5005 ⁽¹⁾
	304	316L	UGINOX FTE K41	UGINOX FME K44	UGINOX AME 316L			
Density	7.9	8	7.7	7.7	8	7.18	8.93	2.7
Expansion in mm/m per 100°C	1.75	1.6	1.1	1.08	1.6	2.2	1.68	2.35
Melting point in °C	1450	1440	1505	1495	1440	418	1083	660
Modulus of elasticity in MPa x 10 (20°C)	200	200	220	220	200	80	120	69
Yield strength in MPa	320	340	320	380	340	110/150	190	45
Tensile strength in MPa	670	620	490	520	620	150/190	260	120
Thermal conductivity in W/m.K	15	15	25	23	15	110	328	201
Mean elongation in %	50	48	30	28	48	40	25	27
Standard thickness in mm	0.4/0.5	0.4/0.5	0.4/0.5	0.4/0.5	0.4/0.5	0.65/0.8	0.5/0.6	0.7

(1) Reference of a type of zinc, copper or aluminium traditionally employed in roofing



Battle Abbey Visitor Facilities, East Sussex- England.
 Contractor: Westridge Construction
 Project Manager: Dannatt Johnson Architects
 © Aperam
 Executed using grade UGINOX AME

Our size range

Our complete range of roofing products is available in traditional formats. For each width, this table shows lengths in linear metres in relation to gauge, calculated on the basis of 100 kg coils, rounded to the nearest linear meter.

Commercial designations		UGINOX Tinned						UGITOP, UGIBRIGHT, UGIBAT			
		UGINOX FTE K41		UGINOX FME K44		UGINOX AME 316L		304		316L	
Widths	Thicknesses	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.5
500		65	51	65	51	63	50	63	50	63	50
580		56	44	56	44	54	43	54	43	54	43
625								50	40	50	40
650											
670		48	38	48	38	47	37	47	37		
800		40	32	40	32	39	31	39	31	39	31
1000		32	26	32	26	31	25	31	25	31	25
1160		28	22	28	22	27	21				
1250								25	20	25	20

We also offer metal in sheet form in packs of 1 tonne. For the two gauges in question, the standard sheet dimensions are 1000 x 2000 mm.
 Please discuss any specific request with your contact.

Solution

We guarantee

you a level of quality and uniformity of surface across our entire specialist range of finishes for the construction sector: UGIBRIGHT, UGIBAT, UGITOP.

Affording freedom of form and appearance, stainless steel roofing blends into all environments and is suited to all styles of architecture, both newbuilds and renovation projects. Longlasting, easy to maintain and recyclable, it satisfies sustainable development considerations. Our stainless steels are suited to the various construction systems presented below. For each technique, our experts are available to advise and guide you in your choice.

Fully Supported Roofs

Standing Seam Roofs

This traditional roofing technique is noted for its linear pattern. Assembled on site from stainless steel strips, these roofs are suited to both contemporary and traditional architecture.

The stainless steel strips are joined along their length by crimping of the previously raised edges.

The bending or closing of the profile is performed in the traditional manner or using specialist tools. The standing seam thus provides a particularly neat finish.

The limited number of transverse seams and welds ensures maximum weathertightness particularly suited to regions with harsh climates (mountains or continental climate with a high level of exposure to wind, rain or snow).

Advantages:

- > Attractive appearance.
- > Ideal for large flat surfaces that require the use of long strips.
- > Ideal for curved surfaces and complex forms.
- > Maximum weathertightness.
- > Ease of installation and cost reduction.
- > Malleability of stainless steel.



WPC, Haacht - Belgium.
Architect: Ortwin Deroo
© ME Construct
Executed using grade 304
with UGIBRIGHT finish



GZI Guido A. Zäch Institut AG, Nottwil - Switzerland.
K und W Steib, Architekturbüro BSA/SIA, Basel
Executed using grade 304 with UGITOP finish

08 Fully supported roofs

10 Self-supporting roofs

Roofs in mountainous regions

11 Cold roofs

Warm roofs and the various construction methods

14 Rainwater collection and drainage

16 Contacts

Batten Roll roofs

The batten roll method is the oldest of the traditional techniques and is particularly suited to rehabilitation projects.

This method consists of joining the strips by interposing a timber batten in the direction of the slope.

In this system, weathertightness between the steel strips is provided by a capping covering the timber battens.

This capping provides the roof with its characteristic wide-joint appearance.

Advantages:

- > Complex roof shapes can be created : convex or concave curved surfaces, domes, cones, etc.
- > Ease of maintenance and repair.
- > A strong visual element is achieved.

Details for fully supported roofs

Our entire range is suited to the construction systems described here. The use of stainless steel enables the use of 14 to 30 metres lengths of strip – dependent upon national regulations – in thicknesses between 0.4 mm and 0.5 mm.

The widths installed depend on every type of site (sheltered, normal or exposed) and on each country's wind zones.



Community Resources Centre, Sheffield - England.
APEC Architects / Ellmore Construction / Carlton Building Services
© Aperam
Executed using grade UGINOX AME

The use of stainless steel enables the use of long strips, which offers the advantage of reducing the number of expansion joints.

strengths

EADS – Gonesse - France.
Caroline Bapst - Bruno Pantz
© Eric Avenel
Executed using grade 304



Self supporting roofs

Stainless steel profiled panels and trays

With its simple and traditional installation technique, this roofing system offers an entire range of trapezoidal or sinusoidal longitudinal profiles that fulfil architects' needs. Trays which are pre-formed in the workshop can be used in all types of regions. This technique facilitates simple and rapid installation.

Advantages:

- > Extent of Profile range and forming capability.
- > Spanning capacity and rigidity, simplicity and less carpentry weight.
- > Economic solution.

An ideal solution for double-skinned roofing designs, pre-formed stainless steel trays coupled with efficient installation and economic costing. Simple and easy to fit, this technique can be used for all types of areas.

Roofing in mountainous regions

In this type of region, projects must be designed and executed taking into account the range of surface temperatures, localised or distributed snow loads, the erosion caused by snow and ice movement and the risk of siphoning.

Our stainless steels are ideally suited to this type of climate, offering:

- > Excellent resistance to thermal shock.
- > No embrittlement in very cold weather.
- > Excellent mechanical strength, capable of withstanding heavy snow loads.

The standing seam roofing system is traditionally used in mountain regions. Self-supporting roofing systems with pre-formed stainless steel trays are increasingly being used for practical reasons, particularly their ease of handling and installation.

UGINOX FTE/FME and UGITOP are suited to mountain regions.



CHRS le Beillard
Gérardmer - France. Architect J. Macchi © J. Macchi
Executed using grade 304 with UGITOP



Refuge Topali - Club alpin Suisse Vallée Matter, St Niklaus.
Meier Associés architectes S.A.
© Aperam
Executed using grade 304 with UGITOP

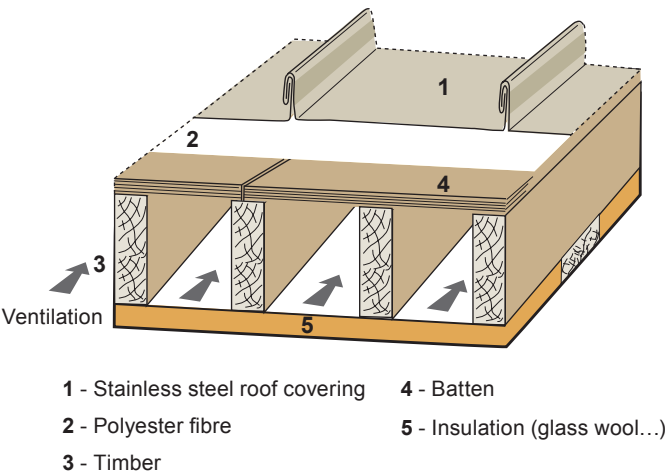
Cold roofs and warm roofs

Cold roofs - Ventilation

In the cold roofing system, ventilation is necessary not only to prevent condensation and its consequences, but also to avoid damage to the roof structure caused by humidity. A free space beneath the roof covering must be incorporated into the roof design with an air inlet and outlet, thus enabling the required ventilation.

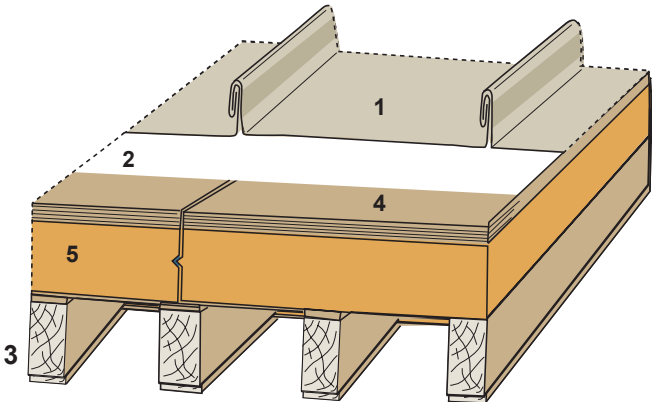
Note: These ventilation requirements apply to roofs of buildings with low or medium relative humidity.

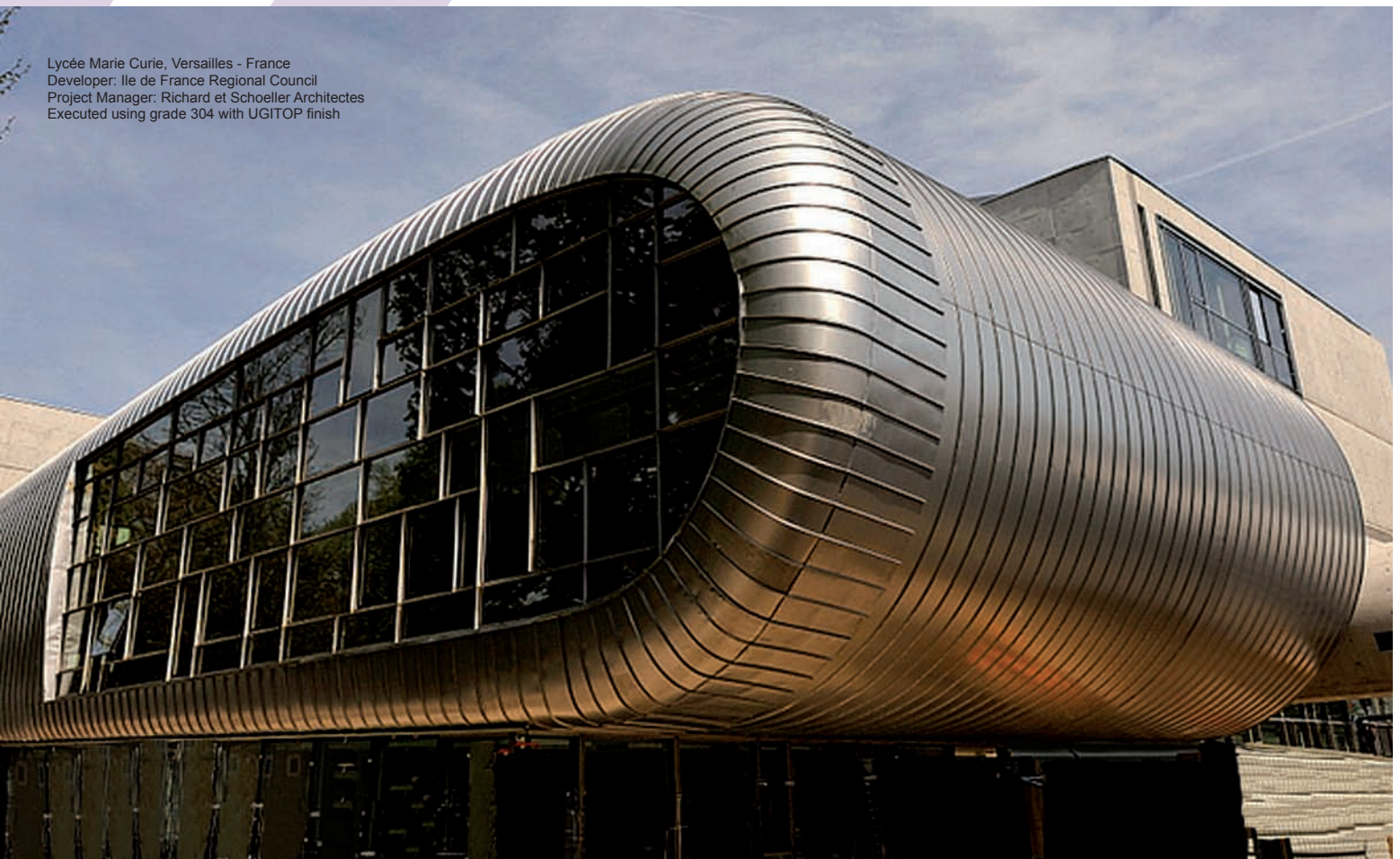
In principle, cold roofs incorporate a cavity enabling ventilation of the components and their supporting structure. If the roof space is fitted out for use, the ventilation operates in the cavity within the roof pitch. If the roof space is void, it serves as a ventilated space. In both cases, nothing must prevent free renewal of the air. The cavity must be continuous.



Warm roofs

Warm roof denotes a roof that, unlike the cold roof, is not ventilated beneath its substrate. The substrate is generally made of monobloc composite panels, comprising the panel itself and insulation.





Examples of warm roof construction systems

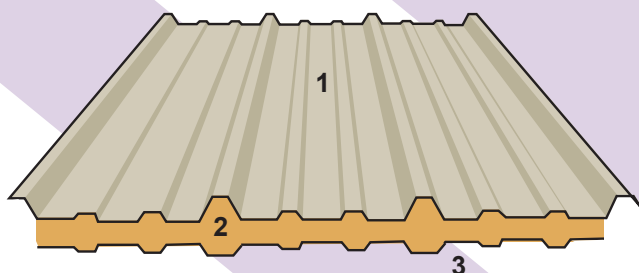
Roofing with roll-formed stainless steel sandwich panels incorporating built-in insulation

The stainless steel sandwich panel fulfils the roles of thermal insulation and weatherproofing and is "ready to install".

The sandwich panel comprises a stainless steel outer skin and an internal skin in pre-coated or galvanised steel, between which there is a core of rigid foam.

Advantages:

- > Particularly attractive life cycle cost.
- > Integrated solution.
- > Quality and consistency of factory production.

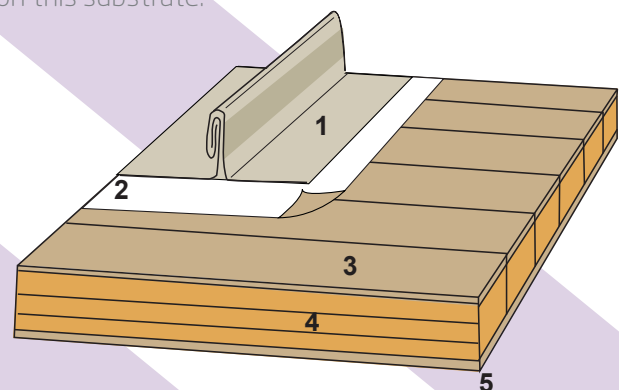


- 1 - Outer stainless steel skin
- 2 - Insulating foam
- 3 - Internal pre-coated or galvanised steel skin

Metal roofing on insulating timber panel

The roof covering substrate is an insulating system comprising an insulating core of extruded polystyrene, an upper skin of particle board panels and a lower panel made of particle boards or timber laths.

The traditional stainless steel roof covering (with standing or cleated seam) is installed on this substrate.

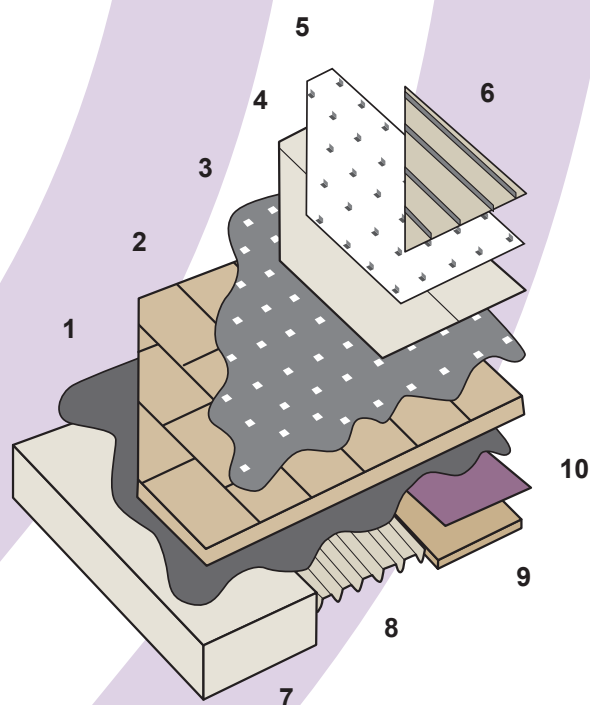


- 1 - Stainless roofing
- 2 - Polyester fibre
- 3 - Upper skin
- 4 - Insulation foam
- 5 - Lower panel

Foamglas® compact warm roofs

This type of roofing can be used in both new build and renovation projects and fulfils all the requirements for stainless steel roofs with complex forms and/or shallow pitches. With excellent thermal and acoustic insulation properties, this system is used particularly in regions that experience wide variations in climatic conditions. This system is completely weathertight and is ideal for buildings with low to very high relative humidity.

- | | |
|------------------------------------|--|
| 1 - Hot-applied weathertight layer | 6 - Stainless steel roof covering |
| 2 - Foamglas® | 7 - Concrete |
| 3 - Bitumen + particle layer | 8 - Ribbed steel sheet |
| 4 - Bituminous membrane | 9 - Timber |
| 5 - Polyester fibre | 10 - Nailed 40 g/m ² fibreglass mat |



Paris-Charles de Gaulle Airport, Terminal 2E.
© ADP Laboratory/Th. D'Hoste and © ADAGP
Foamglas® roofing constructed using grade 304 with UGITOP finish





innovation

Solar Panels

Stainless steel is a material of choice in the manufacture of photovoltaic solar panels for electricity generation and thermal solar panels for heat production.



Rehabilitation of the offices of the Yves Jautard Architectes practice and of Solarte, Ria - France.
Yves Jautard Architectes
Computer-generated artist's impression

Photovoltaic solar panels

As a mounting for photovoltaic panels, the stainless steel frame is a forward-looking solution contributing to the production and rational use of energy.

SolarStyl® is a photovoltaic module installation comprising a stainless steel frame, a set of rails, cross sections and a fixing system.

Advantages of this system:

- > Easy and rapid installation.
- > Incorporation into stainless steel roofing construction systems such as the standing seam or batten roll techniques.
- > Can be used on all types of roof, in newbuilds as well as renovation projects.
- > Integration of connection system into the stainless steel frame to enable interconnection of modules.
- > This system has obtained the Green Pass'Innovation 2010-075 from the CSTB.

SolarStyl® is a system developed by Aperam Alloys Imphy, subsidiary of Aperam, in conjunction with Stainless Europe.

The use of our stainless steels enables the installation of this system in all environments, even the most corrosive.

Thanks to its attractive appearance, this system is suited to all styles of architecture.

Thermal Solar Panels

Stainless Europe is working in conjunction with the Swiss company Energie Solaire SA to develop the most effective technical solution.

The thermal solar panel incorporates a flat exchanger comprising two thin, stamped and welded sheets of stainless steel. These sheets provide uniformly distributed flow and a high thermal transfer coefficient. This technology enables the production of panels that can be incorporated into all types of roof – sloping, arched, etc.

The use of our KARA ferritic stainless steels offers numerous advantages such a light weight structure, good thermal conductivity and good corrosion resistance.

Solar roof, 200 m², residential building
Vouvry, Switzerland
© Energie Solaire



Collection and dispersal of rain water

Roofing accessories are the ideal complement to a stainless steel roof.

Ideal for rainwater collection, stainless steel enables the manufacture of guttering and downpipes in welded sections or in a continuous length of up to 20 m (according to the width) thus reducing the number of soldered joints and enhancing system integrity. Stainless steel in thicknesses of 0.4 mm and 0.5 mm is easy to work even in cold weather and can be soldered with tin.

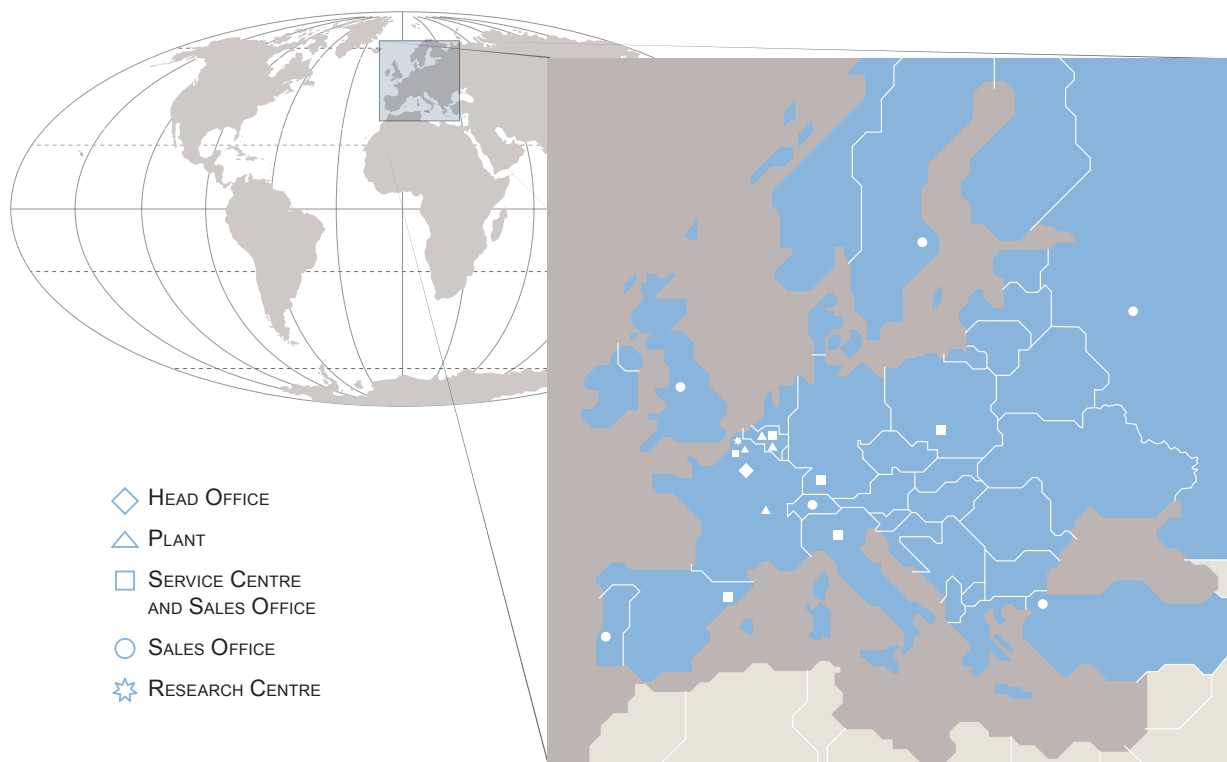
Depending on component length, it can be folded in the workshop or on site, using special tooling.

Please contact us to discuss a solution for your requirements.

UGINOX FTE/FME/AME et UGITOP are traditionally used for roofing accessories.

Kadampa Manjushri Buddhist Temple
Ulverston, Cumbria - England.
Architect : Mark Tole
© ArcelorMittal
Executed using grade UGINOX AME

contacts



Austria

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Fax: +43 7229 8292 013

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