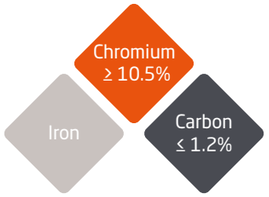
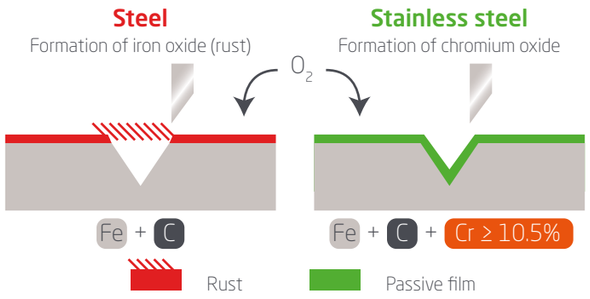
What is stainless steel?

Composition

Steel is an alloy of iron and carbon. Stainless steels are steels containing at least 10.5% chromium, less than 1.2% carbon 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 passive layer naturally regenerates in contact with humidity or water.



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

Transformation

Stainless steels are easily shaped using conventional methods such as forming, bending, shearing, drilling, punching or even welding.

Stainless steels can be attached or assembled to other materials using conventional techniques such as welding, brazing, riveting, mechanical fasteners and adhesive bonding.

They also can be combined without any problem with all types of wood and chipboard.

The 3 Stainless Steel Families

	Grade	European designation	Corrosion resistance - → +	Mechanical resistance Yield Strength	Thermal expansion (100°C)	Suited to forming, bending, brazing, etc. - → +	Application
Austenitics	304/304L	1.4301/1.4307		$R_{p0.2}$ = 320 MPa	1.6 mm/m		Every Application Interior and Exterior Façades & Roofing Metalwork
	316L	1.4404					
Ferritics	K30	1.4016		$R_{p0.2}$ = 320 MPa	1.1 mm/m		
	K36	1.4526					
	K41	1.4509					
	K44	1.4521					
Duplex	DX 2205	1.4462		$R_{p0.2}$ = 500 MPa	1.3 mm/m		Structures
	DX 2304	1.4362					

Selector guide

	Grade	Interior environments		Exterior environments					
					Urban & industrial		Marine		
		Benign, all levels of relative humidity	Corrosive*	Unpolluted rural	Normal	Severe	20 to 10 km	10 to 3 km	Coastal (<3 km)
Austenitics	304/304L	✔	▲	✔	✔	▲	✔	✘	✘
	316L	✔	▲	✔	✔	▲	✔	▲	▲
Ferritics	K30	✔	✘	✘	✘	✘	✘	✘	✘
	K36	✔	▲	✔	✔	▲	✔	✘	✘
	K41	✔	▲	✔	✔	▲	▲	✘	✘
	K44	✔	▲	✔	✔	▲	✔	▲	▲
Duplex	DX2205	✔	▲	✔	✔	▲	✔	✔	✔
	DX2304	✔	▲	✔	✔	▲	✔	▲	▲

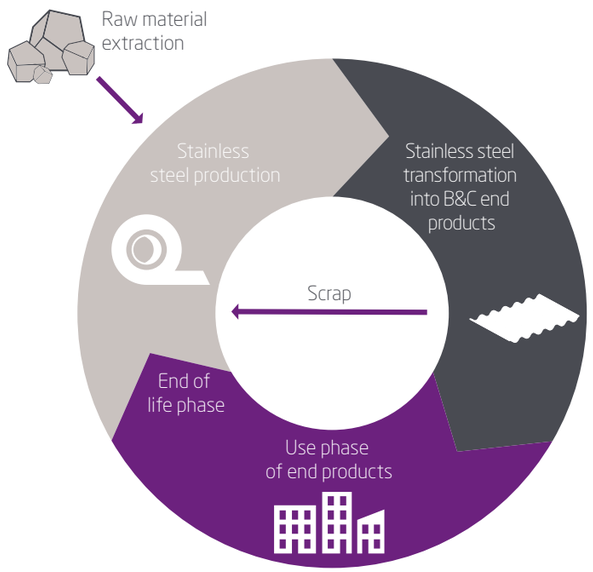
✔ Type suited to the environment ▲ Type whose selection will be determined after consulting us ✘ Type not suited to the environment
*In particular, any environment or atmosphere containing corrosive substances or halogens: chlorides, fluorides, etc.

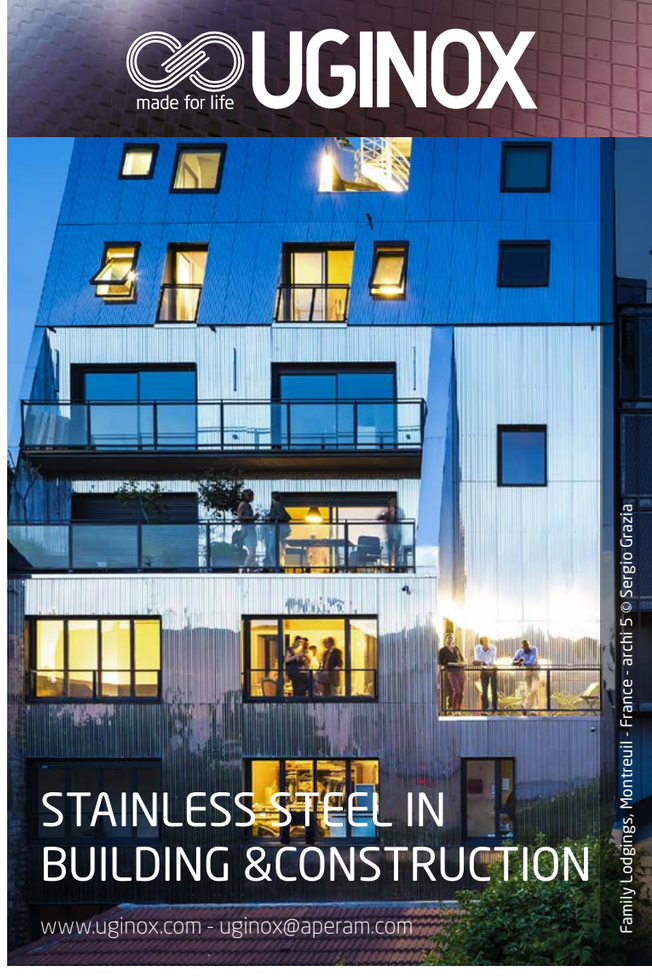
Stainless, a qualitative and economical product!

- Designing and building with stainless steel guarantees excellent overall cost, that is a positive relationship between the final cost and the life cycle. This comes as a result of the exceptional durability of stainless steel buildings, and the almost non-existent, easy maintenance.
- The price stability, especially with our ferritic grades, as well as the cost of transformation and installation is comparable to other metals traditionally used in facades and roofing giving stainless steel its competitiveness.
- The high mechanical characteristics inherent in stainless steel enable the use of thinner gauges.

A 100% recyclable product

- 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, inert and 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 and construction applications: roofs, facades, rainwater recovery systems, domestic water pipes and swimming pools as well as bridges and pedestrian bridges.
- Stainless steel's longevity fulfils the requirements of sustainable construction.
- A suitable choice in terms of grade, surface finish, installation and maintenance guarantees the user unrivalled service life.
- Construction components in stainless steel are delivered ready to install on site reducing pollution (noise, dust, etc.). Furthermore, during demolition, these can be salvaged for re-use in recycling, adding value.





A full range of surface finishes

To meet all architectural styles, we offer a full range of surface finishes from matt to bright through to the colorful and textured, achievable on various grades of stainless steel.

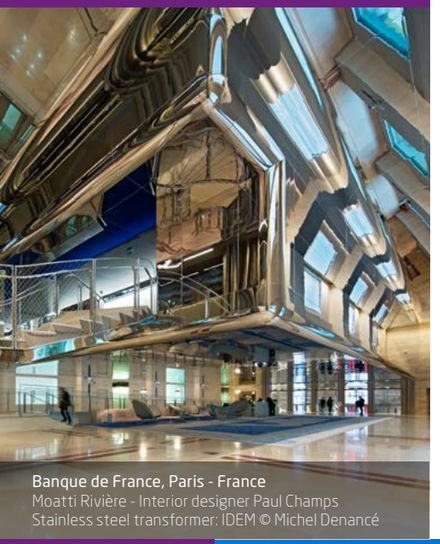
For roofing, we recommend a Terne coated finish, which weathers over time, taking on a living character and matte texture.

Construction products manufactured in all Aperam plants and service centers comply with the CE standard.

Interior & Exterior Decoration

Stainless steel applications are numerous and depend on the imagination of the user:

- Interior decoration: elevators, metal furnishings, store fixtures, decoration of stands, bars, bank counters, entrances, kitchen furnishings and appliances, etc.
- Urban furniture, signs, monuments, sculptures, etc.



Banque de France, Paris - France
Moatti Rivière - Interior designer Paul Champs
Stainless steel transformer: IDEM © Michel Denancé

Pinnacle of cathedral, Rouen - France
PA Lablaude, ACMH. Installer: Viry

Structures

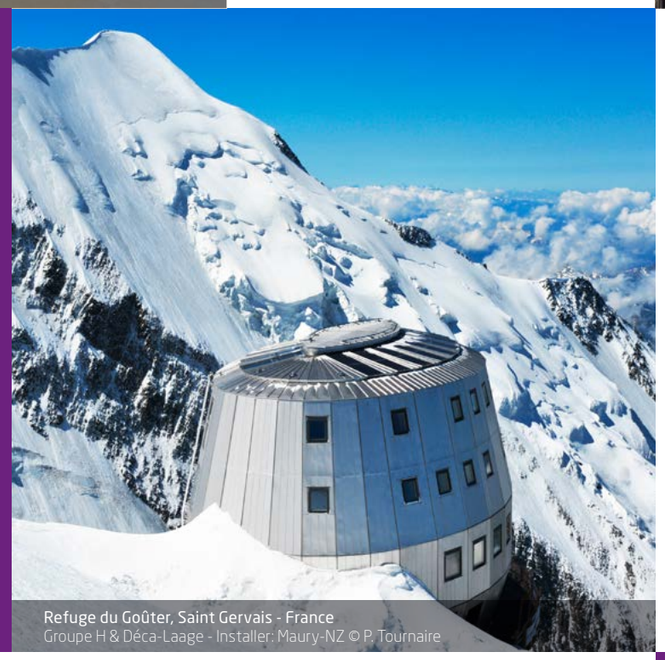
The high mechanical strength of stainless steels enables the conception of slender and aesthetic structures, achieved either by tubes or reconstituted welded beams. The joining elements can also be produced from moulded stainless parts.

Innovation Centre, Derby - UK
Franklin Ellis Architects © Franklin Ellis Architects

Facades

Stainless steel is used for different applications such as cassettes, panels, lats, profiles. The numerous available surface finishes combined with other materials or eventual perforations further increase the possibilities.

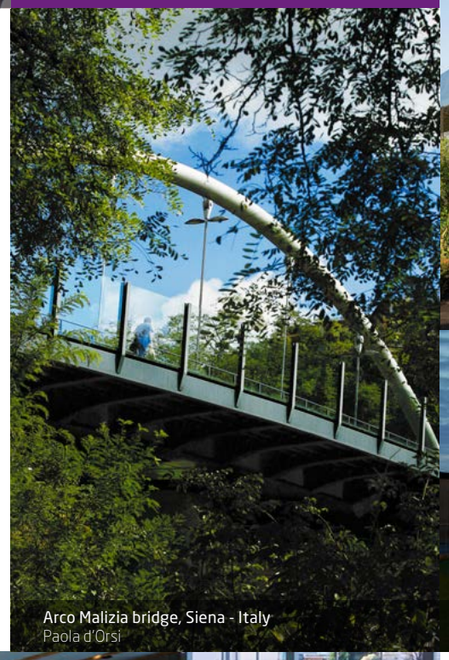
Open Sky Shopping Center - Waves Actisud, Metz - France
Gianni Ranaulo © Pino Musi



Refuge du Goûter, Saint Gervais - France
Groupe H & Déca-Laage - Installer: Maury-NZ © P. Tournaire

Bridges & Pedestrian Walkways

Stainless steel is commonly used in elements of protection - handrails and banisters. It is also recommended for the deck and for anchor elements, including those built in marine and polluted environments. Depending on the environment and the application, the austenitic (304L, 316L) or duplex (DX2205, DX2304) grades may be well-suited.

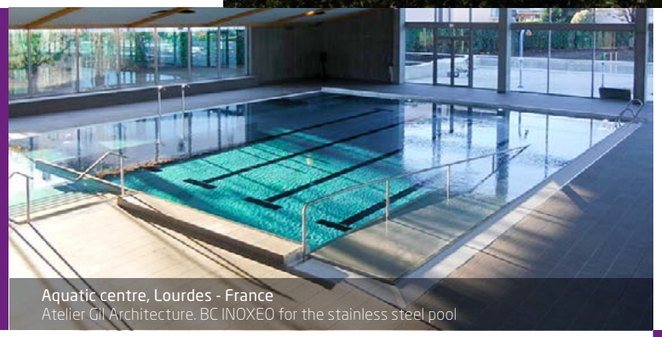


Arco Malizia bridge, Siena - Italy
Paola d'Orsi

International Memorial of Notre Dame de Lorette - France
Philippe Prost / AAPP © adagp – 2014 / Stainless steel transformer: Citynox / © Aitor Ortiz

Roofing

Stainless offers a wide variety of shapes and finishes, perfectly adapted to all types of installation techniques (batten rolls, standing seams, self-supporting trays) and to both new and existing structures. Stainless steel is the building material which distorts the least compared to other materials, enabling its use in long single pieces (from 1 to 20 meters depending on different national guidelines) Furthermore, the number of solders or expansion joints is reduced allowing for quick installation whilst reducing the risk of leaks. In addition, the excellent mechanical resistance of stainless steel permits the use of thin gauges (0.4-0.5mm) giving a considerable material gain.



Aquatic centre, Lourdes - France
Atelier GI Architecture. BC INOXEO for the stainless steel pool

Collection and disposal of rain water

Stainless steel allows manufacturing and assembly costs to be reduced. The pieces can be folded directly on site, at ground level or on the roof, in long lengths and broad widths. Due to the long lengths permitted, the number of soldered joints, expansion joints or expansion stop ends is lowered, decreasing installation time and the risk of leaks.

In contact with water stainless steel does not release compounds that may alter the composition of the water, unlike other materials such as lead, copper and zinc.

Berufsschule Dingolfing - Germany
Schobner & Wagner Architekten © Aperam

Swimming Pools

Today, our range of stainless steels covers all requirements relating to swimming pool applications: pools, ladders, diving boards but also the water distribution systems. The grades employed are principally austenitic (type 316L). For certain applications in harsher environments, such as the thermal spa, one can employ grades with even higher properties, such as duplex (DX2205, DX2304).

Notre-Dame-de-Gravenchon Hall - France
Atelier Gilles Thorel