aperam
made for life

Igniting the Mobility & Transport Revolution

with Aperam stainless steels

Designing for the Next Mobility Era: Materials that Meet the Challenge

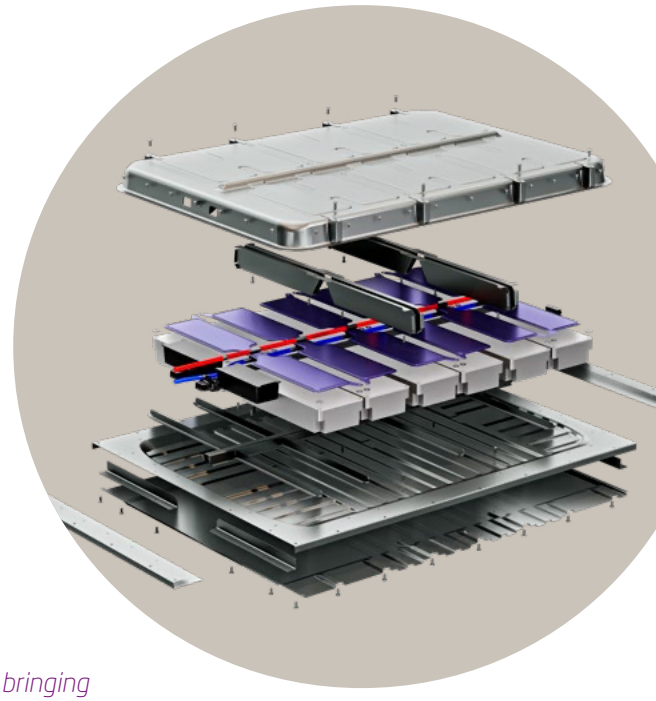
The mobility sector – encompassing automotive, rail, aviation and maritime industries – is undergoing a profound transformation. In the automotive industry specifically, regulatory pressure is accelerating the shift towards zero-emission vehicles. The EU's 2035 ban on new internal combustion engine (ICE) vehicles sets a clear deadline for full electrification. Similarly, the International Maritime Organization (IMO) aims to reduce greenhouse gas emissions from international shipping by 100% by or around 2050.

This transformation demands more than drivetrain innovation. It calls for material solutions that combine mechanical performance, cost-efficiency and a reduced carbon footprint – from the design phase onwards.

Aperam supports mobility design engineers in this transition by providing:

- Stainless steel solutions tailored for structural and safety-critical components, including battery housings
- A low-carbon production model based on scrap recycling and electric arc furnace technology
- Co-development partnerships focused on functional integration and system cost optimisation
- Disruptive technologies and new stainless steel grades engineered for e-mobility applications

From material supply to application design, Aperam is a reliable partner for efficient, scalable and compliant decarbonisation strategies.



Your Trusted Partner for Navigating the World of Electric Mobility

The entire automotive industry is transitioning towards electrification, bringing complex material challenges for critical components. Aperam addresses these by offering a comprehensive array of advanced solutions, including:

Stainless Battery Housing concept delivering the optimal balance of crash resistance, cost-effectiveness and weight – while being fully recyclable.

Solutions for the truck market where stainless steel provide the best compromise between durability and economic performance in aggressive road environments, without additional coatings.

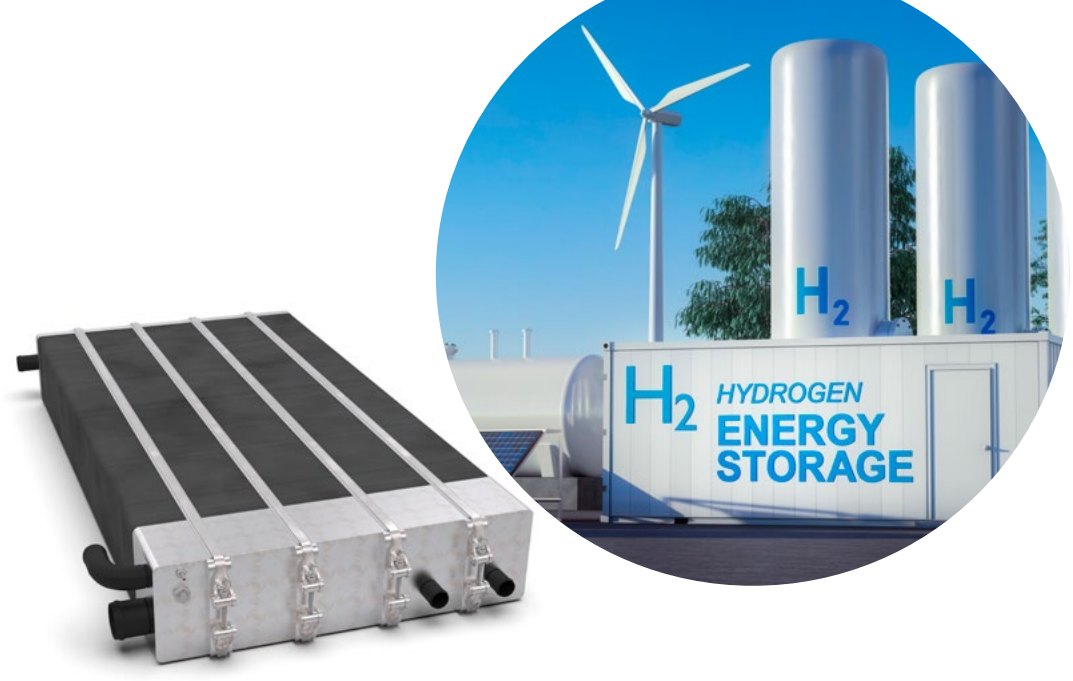
Shielding solutions for electronic units – providing **electromagnetic**, **acoustic** and/or **thermal** protection, enabling complex shapes with structural functions. Thanks to the high strength of stainless steel, these offer space-saving through low thickness, high corrosion resistance without additional coatings, no edge deterioration and excellent insulation due to low thermal conductivity even at high temperatures.

Cell casing materials meeting stringent requirements for deep drawing — critical for forming complex geometries without compromising integrity. Austenitic stainless grades, particularly Aperam 305, are well-suited for this purpose due to their high formability.
Chemical compatibility is equally important to avoid adverse reactions with battery chemistry. While nickel-plated materials are commonly used, regulatory trends suggest a shift towards uncoated alternatives.
In addition, the increasing adoption of immersion cooling and the necessity to manage the thermal propagation underline the need for materials with high mechanical properties, low thermal conductivity, high melting point and robust fatigue resistance—criteria that stainless steels meet particularly well.

Stamped Parts, for example in specialty alloys, for high-performance e-motors in premium electric vehicles and **eVTOLs**, as well as electric **APUs** in aviation. Aperam's solutions enable motor rotors and stators to achieve up to 30% higher power density, significantly reducing the weight of these electric engines.

The main advantages of stainless steel for **electric mobility:**

- Fire resistance
- Width up to 2 m
- Good drawability
- Aperam 301, 304, 305, 316A, K41



Material Excellence to Scale Up Hydrogen Mobility

The use of hydrogen in the transport sector is set to expand rapidly in the coming years, particularly for light commercial vehicles, heavy-duty trucks, off-highway vehicles and even aviation. The opportunities linked to this expected growth fall into two main categories: fuel cells and hydrogen fuel tanks.

Fuel cells: the primary challenge lies in developing and producing high-quality, efficient, and cost-competitive fuel cells for electric vehicles. Bipolar plates are a strategic component with high added value for fuel cells.
Combining excellent mechanical strength, high formability, low gas permeability and superior electrical and thermal conductivity, our stainless steels for bipolar plates enable improvements in both system efficiency and overall competitiveness.

Hydrogen fuel tanks: the use of liquid hydrogen in heavy-duty vehicles offers significant potential to extend range, reduce refuelling times and optimise payload capacity. The challenge is answering safe storage and transport of liquid hydrogen at cryogenic temperatures.
Delivering high strength, outstanding ductility, fatigue resistance and excellent weldability, our stainless steels are the preferred material for these demanding applications.
With liquid hydrogen technology evolving rapidly in the mobility sector, Aperam actively contributes to this progress through partnerships with several of the world's leading research institutes, ensuring its position at the forefront of innovation.

The main advantages of stainless steel for **fuel cells:**

- Easy to weld
- 75 µm
- Bright Annealed
- Aperam 316, 304, 316A

The main advantages of stainless steel for **hydrogen fuel tanks:**

- Easy to weld
- High strength
- H_2 compatible
- Aperam 316L, 304LN...
  Other grades under development

A Historical Partner in the Mobility Sector

Aperam has been a long-standing and trusted partner to the mobility sector. Its ability to develop technically advanced stainless steel solutions is supported by a portfolio of patented grades, proven industrial partnerships and recognised metallurgical expertise.

Aperam has consistently demonstrated its capacity to design stainless steels adapted to the evolving requirements of internal combustion engine (ICE), hybrid and electric vehicle manufacturers. Notably, K44X — a patented grade developed by Aperam — was engineered to meet the demanding mechanical strength and oxidation resistance needs of high-temperature environments in ICE and hybrid systems. It ensures reliable performance under severe operating conditions, particularly in exhaust system.

From Concept to Integration

Aperam's involvement extends well beyond material supply. The company actively supports its clients in the design and engineering phases, providing metallurgical expertise and processing guidance. This integrated approach has enabled the successful completion of key projects, including:

LNG tanks for mobility applications, where Aperam 301 stainless steel ensures both mechanical strength and cryogenic resistance. Aperam contributed to the structural and thermal optimisation of LNG vehicle tank designs.

Decorative trims, where Aperam supplies customised finishes aligned with OEM design specifications. These include mirror, satin, or textured aspect surfaces that satisfy both aesthetic and functional demands for interior and exterior automotive applications.

Aperam as a preferred partner

As mobility sector evolves, Aperam's metallurgical expertise, innovation capability and integrated process know-how, position it as a reliable partner for manufacturers seeking durable, cost-effective, and sustainable stainless steel solutions.

The main advantages of stainless steel for **automotive:**

- Fire resistance
- Thermal Insulation
- Good drawability
- Aperam K44X, 309N, K41X, K39M

The main advantages of stainless steel for **decorative trims:**

- Aesthetic
- Corrosion resistance
- Good drawability
- Aperam K36, K45

Our Grades

	Grade designations	Standards			Chemical composition (typical values)							PREN*	Mechanical properties annealed condition (typical values)		
		AISI	UNS	EN	C	Si	Mn	Cr	Mo	Ni	Others		R_m	$R_{p0.2}$	A%
Austenitic stainless steels	Aperam 301	301	S30100	1.4310	0.100	0.90	1.30	16.80		6.60		19	810	320	55
	Aperam 301L	301L/301LN	S30103/S30153	1.4318	0.025	0.50	1.70	17.50		6.60	N = 0.110	20	760	350	48
	Aperam 301M	301	S30100	1.4310	0.100	0.60	0.90	17.30		7.30		19	730	320	57
	Aperam 301R	(301)	S30100	1.4310	0.100	1.15	1.20	16.70	0.70	6.65		20	800	340	56
	Aperam 304	304	S30400	1.4301	0.050	0.40	1.10	18.20		8.05		20	630	310	54
	Aperam 304ED	304	S30400	1.4301	0.045	0.40	1.10	18.20		9.10		20	610	270	57
	Aperam 304H	304H	S30409	1.4301/1.4948	0.050	0.40	1.10	18.20		8.05	C mini 0.04	20	660	300	54
	Aperam 304L	304L	S30403	1.4307	0.025	0.40	1.40	18.20		8.05		20	630	310	54
	Aperam 304M	304L	S30403	1.4306	0.025	0.40	1.30	18.20		10.10		20	580	250	54
	Aperam 305	305	S30500	1.4303	0.025	0.40	1.30	18.50		12.60		19	570	250	52
	Aperam 321	321	S32100	1.4541	0.025	0.40	1.10	17.15		9.10	Ti = 0.30	19	620	290	52
	Aperam 321H	321H	S32109	1.4541/1.4878	0.045	0.40	1.10	17.15		9.10	Ti = 0.30	19	620	290	52
Austenitic stainless steels containing molybdenum	Aperam 316A	–	S30416	1.4682	0.02	1.00	–	18.00	0.50	9.50	N = 0.065	21	630	330	50
	Aperam 316B	316L	S31603	1.4435	0.020	0.40	1.35	17.30	2.60	12.70		26	590	290	49
	Aperam 316C	316L	S31603	1.4432	≤0.03	0.40	1.35	16.80	2.60	11.10		26	620	320	49
	Aperam 316L	316/316L	S31600/S31603	1.4401/1.4404	0.025	0.40	1.20	18.20	2.10	10.10		24	610	300	52
	Aperam 316T	316Ti	S31635	1.4571	0.035	0.40	1.20	16.80	2.10	10.70	Ti = 0.350	24	600	290	50
Duplex	DX2101	21-01	S32101	1.4462	0.025	–	5.20	21.90	0.20	1.60	N = 0.21	26	740	550	32
	DX2202	22-02	S32202	1.4062	0.025	0.40	1.30	23.00	0.30	2.50	N = 0.21	27	750	560	32
	DX1803 / DX2205	22-05	S32205	1.4462	0.020	0.30	1.80	22.80	3.10	5.50	N = 0.17	33/36	830	620	29
	DX2304	23-04	S32304	1.4362	0.020	0.40	1.50	23.00	0.30	4.90	Cu = 0.40 - N = 0.10	26	740	550	30
	DX2507	25-07	S32750	1.4410	0.020	–	–	25.80	3.50	6.70	N = 0.26	42	910	680	30
Ferritic stainless steels KARA key for value	K30	430	S43000	1.4016	0.040	0.35	0.30	16.50				17	500	330	27
	K33X	433	S43690	1.4513	0.015	0.50	0.25	17.30	0.90		N = 0.015 - Ti = 0.35	20	470	300	31
	K36	436	S43600	1.4526	0.020	0.40	0.25	17.50	1.25		Nb = 0.50	22	510	350	30
	K39M	430Ti	S43037	1.4510	0.020	0.40	0.30	16.50			Ti = 0.40	17	460	300	30
	K41	441 (1)	S43932/S43940	1.4509	0.015	0.60	0.30	17.80			Ti + Nb = 0.65	18	490	320	30
	K44X	444	S44400	1.4521	0.015	0.40	0.30	19.00	1.90		N = 0.015 - Nb = 0.60	25	540	360	30
	K45	445 (1)	S44500	1.4621	0.015	0.25	0.25	20.20			Nb = 0.45 - Cu = 0.45	21	490	340	31

For 301, 301L, 301M, 301R and 304 grades, standard cold worked conditions are defined according to EN 10088-2, with a typical C1000 (Rm) tensile strength range of 1000-1150 MPa. Tensile values are measured in the rolling direction, in accordance with ISO 6892-1. Cold worked properties tailored to customer-specific requirements are available on request.

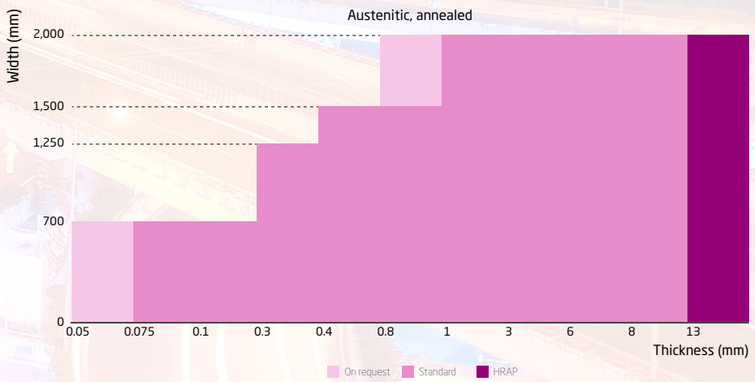
* Pitting Resistance Equivalent Number – % Cr+3.3x% Mo+16x% N – Typical values

Formats

Coils | Slitted coils | Sheets | Tubes

Please consult us for other formats

Size Range



Aperam, Your Partner in Innovation

We put our expertise and industrial capabilities at the service of our customers to help them innovate quality, cost-effective and sustainable solutions.

Committed to sustainability

We have always been committed to environmental issues. Committed to corporate social responsibility (CSR), we put sustainability at the heart of our business, with the aim of drastically reducing our carbon footprint by 2030. We also provide innovative and sustainable solutions that meet our customers' most demanding needs while helping them reduce their own carbon footprints.

One of the widest ranges of stainless steels and alloys on the market

Aperam is structured into four main segments: Stainless & Electrical Steel, Services & Solutions, Alloys & Specialties and Recycling & Renewables. These activities cover the complete range of products and services in stainless and specialty steels.

A network of service centres

Aperam has an extensive network of service centres and sales offices, strategically located in Europe and around the world. These centres enable us to respond quickly and efficiently to the processing and distribution needs of stainless steel products. This network also ensures maximum proximity and flexibility for our customers, optimising delivery times, logistics and first-level processing costs.

Exclusive expertise in low-carbon stainless steel and the circular economy

Aperam is a pioneer in the production of low-carbon stainless steel, with a unique circular production process. Thanks to our innovative model, we buy back our customers' stainless steel scrap and re-integrate it into our production chain.
This recycling system reduces our carbon footprint – and that of our customers.

Three research centres bring our customers the very best in materials innovation

Our research centres collaborate with our customers, as well as with world-renowned universities and other research centres. Together, they work on a wide range of challenges, including e-mobility, the energy transition and the development of solutions for reusable packaging. This network of expertise enables Aperam to remain at the forefront of industrial innovation.

Contact

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