



aperam
made for life

Our precision stainless
steel offer

precision

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Edge dressing

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

Aperam's stainless : a better choice.

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

Aperam Stainless Precision offers the **most comprehensive and innovative** range of stainless steel solutions in order to satisfy the wide variety of expectations:

A tailor-made solution for each customer.

Aperam Stainless Precision enjoys a **recognised and long-standing expertise** in several specialities: gauges from 0.075mm*, widths up to 700mm, high specification surface finishes and mechanical characteristics, quenched martensitics...

* For all gauges < 0.075mm, please consult us.



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stainless steel ?

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Aperam Stainless Precision, producing and supplying stainless steel solutions

In addition to the products offered in the following pages, we also offer our customers a varied portfolio of services. Our aim is to become your preferred supplier.

Your satisfaction is our top priority.

Technical Partnership



Our team of commercial and technical people is at your disposal. Their experience and skills will enable them to discuss and suggest enhancements to your technical requirements. Aperam's unique global network will support you wherever you are.

Logistics

Our dedicated logistics team, will ensure that lead times and quality of service are a priority, constantly adapting the service to your needs and the market requirements.

Moreover, we can offer small quantities, on short lead times.

Quality

Globally, Aperam's quality serves as a benchmark for stainless steel products.

Our aim is to provide outstanding quality which meets your approval.

Our certificates reflect this :
ISO 9001, ISO TS 16949, ISO 14001, TUV, OHSAS 18001, Rolls Royce Sabre 9000 ...

Product Innovation

Developing new products and markets is essential to our joint future businesses.

As well our own laboratory, we also benefit from the support of the Group's stainless steel research centre.

This enables us to innovate and develop stainless steel solutions for new as well as existing applications.





Close inspection of the cylinder surface for the flatness operation (via skin-pass)

Our profession : Precision cold rolling

For 200 years, our French mill has been dedicated to the cold rolling of special steels. From carbon steels to stainless steels this experience has enabled us to become a specialist in ultra thin stainless steel, always pushing the boundaries to find solutions to ever more complex demands.

From Standard flat products to Precision strip products

To complement the standard flat products range (which is produced by Aperam Stainless Europe), our machinery is devoted to producing thin and ultra thin gauges, as well as special metallurgical finishes.

We offer 3 metallurgical finishes in stainless steel :

- **Annealed :**

The Precision strip range covers gauges $< 0.30\text{mm}$. However we can produce gauges up to 2.50mm if there are particular specifications such as :

- > Special geometric tolerances
- > Narrow widths
- > Special finishes
- > Dressed edges
- > Low quantities

- **Temper Rolled :** All products at $\leq 2.50\text{mm}$ gauges

- **Hardened and Tempered :** All products at $\leq 2.00\text{mm}$ gauges

What is stainless steel ?

Steel is an alloy of iron and carbon.

Stainless steels contains 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.

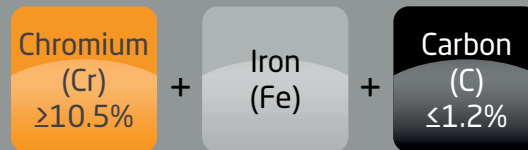
This oxide, referred to as the "passivation layer", provides it with lasting protection against all types of corrosion. This passivation layer is naturally self-healing when in contact with humidity or water.

Stainless 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.

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 therefore unaffected by Nickel price fluctuations.

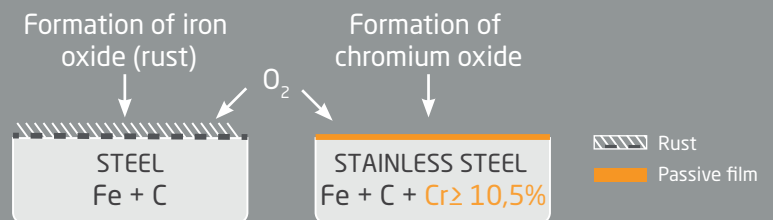
Composition of stainless steel



$\text{Fe} + \text{C} = \text{STEEL}$

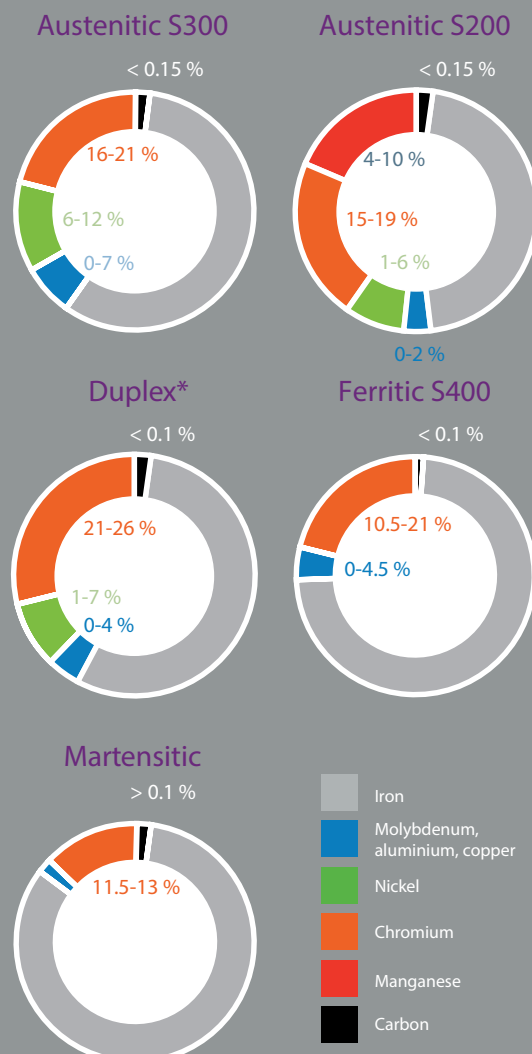
$\text{Fe} + \text{C} + \text{Cr} = \text{STAINLESS STEEL}$

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



Stainless steel grade categories

Technical performance, safety in service and economic competitiveness. In order to satisfy these requirements, Aperam Stainless Precision offers you a complete range of solutions with 5 categories of stainless steel : Austenitics (S300), Austenitics with manganese (S200), KARA Ferritics, Martensitics (S400) and Duplex*



* Consult us for thin gauges.

complete offer

Because your needs are diverse, we have built an extensive product range :

> **A wide selection of grades** which are cost effective and also meet your technical requirements :

Austenitics (200 & 300 Series), Ferritics and Martensitics (400 Series), Duplex (*consult us*)

> **A unique dimensional range :**

Thickness : from 0.075 to 2.50mm

Width : from 4 to 700mm

> **Metallurgical conditions :**





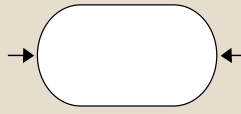
Annealed : our annealing lines enable us, amongst other things, to offer products which expedite ultra deep drawing.

Temper Rolled : we can achieve tensile strengths of 2200 MPa.

Hardened and Tempered : uniquely for Martensitic grades, this allows us to reach hardness levels of 52 HRC.

> **Precision geometric tolerances** (coil set, waviness, crossbow, edge camber)

> **Different edge finishes :**

Slit edges	Slit / deburred	Machined / deburred	Square edges	Round edges
				
Slitting leaves a straight edge without excessive burr ASTM : Edge N°3 Burr height : Normal $\leq 10\%$ of thickness Precision $\leq 5\%$ of thickness	After slitting, the corners are mechanically removed ASTM : Edge N°3	After slitting, the 4 corners are machined ASTM : Edge N°5	After slitting, the 4 edges are machined to remove all burrs ASTM : Edge N°1	After slitting, the edges are mechanically rounded ASTM : Edge N°1

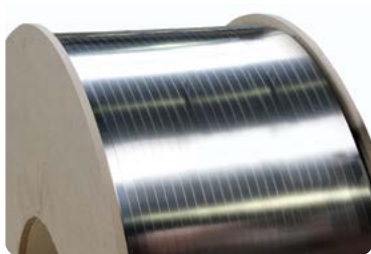
> **All kinds of packaging :**

Coils



- Thickness : from 0.075 to 2.50mm
- Width : from 4 to 700mm
- Inside Ø : 300, 406, 508mm*

Oscillated wound coils**



- Thickness : from 0.09 to 1.20mm
- Width : from 5 to 39mm
- Inside Ø : 400, 508mm
- Winding width : 100 to 500mm
- Weight : 250 to 1000Kg

Plates



- Thickness : from 0.20 to 2.50mm
- Width : from 100 to 670mm
- Length : 200 to 3500mm*

Discs



- Thickness : from 0.30 to 1.30mm
- Diameter : from 113 to 655mm

* Others : Consult us for other dimensions

** Oscillated wound coils : Coils welded end to end, and rolled onto one dispenser, which improve productivity as a result of simpler handling.

> A wide range of surface finishes :

We offer a complete range of surface finishes ; from rough through to ultra smooth, and from matt through to ultra bright ; adapted to the different metallurgical conditions (annealed, temper rolled, or hardened and tempered)

Annealed



ULTRA BRIGHT
2R - BA ($Ra \leq 0.10\mu m$)



BRIGHT (our standard)
2R - BA ($Ra \leq 0.30\mu m$)



DULL
2B or 2D ($Ra \leq 0.30\mu m$)



ROUGH
We offer 3 levels* of roughness :
 $Ra 0.10$ to $0.50\mu m$
 $Ra 0.50$ to $1.00\mu m$
 $Ra 1.00$ to $1.80\mu m$

Temper Rolled



BRIGHT
2H ($Ra \leq 0.15\mu m$)



MATT (our standard)
2H ($Ra \leq 0.30\mu m$)



ROUGH
We offer 3 levels* of roughness :
 $Ra 0.10$ to $0.50\mu m$
 $Ra 0.50$ to $1.00\mu m$
 $Ra 1.00$ to $1.80\mu m$

Hardened & Tempered



BRIGHT
2Q ($Ra \leq 0.15\mu m$)



MATT (our standard)
2Q ($Ra \leq 0.30\mu m$)



POLISHED
2G (Polished, grain size 220)



ROUGH
We offer 3 levels* of roughness :
 $Ra 0.10$ to $0.50\mu m$
 $Ra 0.50$ to $1.00\mu m$
 $Ra 1.00$ to $1.80\mu m$

* Please consult us if you want other levels of roughness



Service

Supplementary service

Our production equipment allows us to react quickly and easily in order to deliver small quantities (from 50Kg) and on short lead times (within 10 days).

We supply a wide range of top quality stainless steel which enables us to meet all your demands ; from supplying sampling for new projects to unforeseen last minute orders.

We keep a constant supply of the most popular grades and thicknesses, which means we can supply within 2 weeks. See table opposite.

In addition, we produce surplus material from production on a daily basis, so do not hesitate to contact us to check what is available in stock

Products in stock

Grades	1.4310				1.4016	1.4301	1.4404
	X10CrNi18-8				X6Cr17	X5CrNi18-10	X2CrNiMo17-12-2
	AISI 301				AISI 430	AISI 304	AISI 316L
Surface aspects	2H				2R	2R	2R
Mechanical Characteristics	C850 850-1000MPa	C1000 1000-1150MPa	C1150 1150-1300MPa	C1300 1300-1500MPa	450-600MPa A ≥ 20%	540-750MPa A ≥ 45%	530-680MPa A ≥ 40%
Thicknesses							
0.10mm			◇	●		●	
0.12mm				●			
0.15mm			●	●		●	
0.20mm	◇	●	●	●	◇	●	◇
0.25mm			●	●	◇	●	◇
0.30mm	◇	●	●	●	◇	●	◇
0.35mm				●			
0.40mm	◇	●	●	●			
0.50mm	●	●	●	●			
0.60mm	●	●	●	●			
0.70mm				●			
0.80mm		●	●	●			
1.00mm		●	●	●			
1.20mm				●			
1.50mm			◇	●			
2.00mm			●	●			

● Lead time : 2 weeks (ex-works)

◇ Lead time : 4 to 6 weeks (ex-works)

Technical Overview

The Precision grades

If you need general information on our grades (norms, chemical compositions or mechanical characteristics), please refer to the table below. More detailed information for each of our products is available on our technical data sheets.

	Commercial designations	Norms				Chemical compositions (indicative values) %							Anneal condition (typical values) Transversely measured			
		European designations according to EN 10088-2	American designations according to ASTM	Japanese designations according to JIS	C	Si	Mn	Cr	Mo	Ni	Others	Rm (MPa)	Rp 0.2 (MPa)	A (%)	Hardness (HV)	
Martensitic Stainless Steel	MA2	1.4021	X20Cr13	420	SUS420J1	0.22	0.35	0.35	13.3				600	380	23	170
	MA2H	1.4021	X20Cr13	420	SUS420J1	0.22	0.35	0.35	13.3				600	380	23	170
	MA3	1.4028	X30Cr13	420	SUS420J2	0.32	0.2	0.3	13.7				660	430	20	185
	MA3H	1.4028	X30Cr13	420	SUS420J2	0.32	0.2	0.3	13.7				660	430	20	185
Ferritic Stainless Steel	K09	1.4512	X2CrTi12	409		0.01	0.55	0.2	11.1			Ti = 0.2	450	280	30	130
	K30	1.4016	X6Cr17	430	SUS430	0.04	0.27	0.3	16.15				510	360	24	160
	K30L			430L		0.015	0.3	0.4	16.3				460	320	28	145
	K31	1.4017	X6CrNi17-1	(431)		0.02	0.15	0.4	16.8		1.4		700	530	15	220
	K39M	1.4510	X3CrTi17	430Ti	SUS430LX	0.02	0.35	0.3	16.15			Ti = 0.35	480	320	26	150
	K41	1.4509	X2CrTiNb18	441		0.015	0.6	0.25	17.65			Ti = 0.14 Nb = 0.38	520	350	26	160
	K44	1.4521	X2CrTiNb18-2	444	SUS444	0.015	0.5	0.3	17.7	1.85		Ti = 0.17 Nb = 0.28	560	370	20	170
Austenitic Stainless Steel with Manganese	16-1Mn	1.4616	X8CrMnCuNi16-9			0.1	0.35	9	15.3		1	Cu = 1.5	800	450	50	250
	16-4Mn	1.4372	X12CrMnNi17-7-5	201		0.09	0.5	6.5	16.3		4.15		820	420	50	210
Austenitic Stainless Steel	17-7A	1.4310	X10CrNi18-8	301	SUS301	0.11	0.9	1.2	16.8		6.55		850	380	48	195
	17-7C	1.4310	X10CrNi18-8	301	SUS301/301J1	0.1	0.6	0.85	17.3		7.25		750	330	50	180
	17-7E	1.4310	X10CrNi18-8	(301)		0.1	1.15	1.2	16.65	0.7	6.65		830	370	48	195
	18-9E	1.4301	X5CrNi18-10	304	SUS304	0.05	0.42	1.1	18.15		8.05		680	310	48	170
	18-9DDQ	1.4301	X5CrNi18-10	304	SUS304	0.045	0.4	1.1	18.15		9.05		640	280	52	160
	18-10L	1.4306	X2CrNi19-11	304L	SUS3054L	0.022	0.42	1.32	18.15		10.05		600	270	55	150
	18-9L	1.4307	X2CrNi18-9	304L		0.025	0.42	1.4	18.15		8.05		620	310	50	160
	18-12D	1.4303	X4CrNi18-12	305	SUS305	0.025	0.42	1.32	18.4		12.55		600	270	50	150
	18-10T	1.4541	X6CrNiTi18-10	321	SUS321	0.025	0.42	1.1	17.15		9.05	Ti = 0.30	640	280	52	155
Austenitic Stainless Steel with Molybdenum	18-11ML	1.4404	X2CrNiMo17-12-2	316L		0.025	0.42	1.2	16.65	2.05	10.05		630	310	48	160
	17-11MT	1.4571	X6CrNiMoTi17-12-2	316Ti	SUS316Ti	0.035	0.42	1.1	16.65	2.05	10.6	Ti = 0.34	620	300	50	150
Refractory Stainless Steel	R20-12	1.4828	X15CrNiSi20-12			0.048	1.6	1.32	19.15		11.4		660	320	50	155

(1) Low carbon : Please consult

Tolerances (in mm) on thickness according to EN ISO 9445-1 norm

Thicknesses (t) (mm)	Widths (w) (mm)										
	w < 125			125 ≤ w < 250			250 ≤ w < 720			w < 1100	
	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight
0.05 ≤ t < 0.10	±0.10 t			±0.12 t	±0.10 t		±0.15 t	±0.10 t		±0.20 t	±0.15 t
0.10 ≤ t < 0.15	±0.010	±0.008	±0.006	±0.015	±0.012	±0.008	±0.020	±0.015	±0.010	±0.025	±0.018
0.15 ≤ t < 0.20	±0.015	±0.010	±0.008	±0.020	±0.012	±0.010	±0.025	±0.015	±0.012	±0.030	±0.020
0.20 ≤ t < 0.25	±0.015	±0.012	±0.008	±0.020	±0.015	±0.010	±0.025	±0.020	±0.012	±0.030	±0.020
0.25 ≤ t < 0.30	±0.017	±0.012	±0.009	±0.025	±0.015	±0.012	±0.030	±0.020	±0.015	±0.030	±0.020
0.30 ≤ t < 0.40	±0.020	±0.015	±0.010	±0.025	±0.020	±0.012	±0.030	±0.025	±0.015	±0.040	±0.020
0.40 ≤ t < 0.50	±0.025	±0.020	±0.012	±0.030	±0.020	±0.015	±0.035	±0.025	±0.018	±0.040	±0.020
0.50 ≤ t < 0.60	±0.030	±0.020	±0.014	±0.030	±0.025	±0.015	±0.040	±0.030	±0.020	±0.045	±0.030
0.60 ≤ t < 0.80	±0.030	±0.025	±0.015	±0.035	±0.030	±0.018	±0.040	±0.035	±0.025	±0.050	±0.030
0.80 ≤ t < 1.00	±0.030	±0.025	±0.018	±0.040	±0.030	±0.020	±0.050	±0.035	±0.025	±0.055	±0.040
1.00 ≤ t < 1.20	±0.035	±0.030	x	±0.045	±0.035	±0.025	±0.050	±0.040	±0.030	±0.060	±0.040
1.20 ≤ t < 1.50	±0.040	±0.030	x	±0.050	±0.035	x	±0.060	±0.045	±0.030	±0.070	±0.050
1.50 ≤ t < 2.00	±0.050	x	x	±0.060	±0.040	x	±0.070	±0.050	x	±0.080	±0.050
2.00 ≤ t < 2.50	±0.050	x	x	±0.070	x	x	±0.080	±0.060	x	±0.080	±0.050

NB : These tolerances can either be totally + or totally -; or evenly/unevenly split between the two. The total range of the tolerance must remain as indicated in the table.

To ensure that you have made the right choice, please don't hesitate to contact us.
Nothing beats talking directly to our experts.

Commercial designations	Temper rolled condition ranges according to EN 10088-2 / EN10151 Longitudinally measured (MPa) ⁽²⁾									Textured condition	Hardened & Tempered condition		Stretch forming	Weldability	Corrosion resistance (pitting)	
	C600	C700	C850	C1000	C1150	C1300	C1500	C1700	C1900	Rm	Rm	Hardness				
	600 to 700	700 to 850	850 to 1000	1000 to 1150	1150 to 1300	1300 to 1500	1500 to 1700	1700 to 1900	>1900							
MA2			x								1400 MPa min	42 to 47 HRC	•	•	•	
MA2H			x								1500 MPa min	46 to 49 HRC	•	•	•	
MA3			x	x							1500 MPa min	46 to 49 HRC	•	•	•	
MA3H			x	x							1600 MPa min	48 to 52 HRC	•	•	•	
K09			x										••	••••	•	
K30													•	••	••	
K30L			x										•	••••	••	
K31			x							1100 MPa min 1200 MPa min 1300 MPa min			•	••	••	
K39M			x											••	••••	•••
K41			x											••	••••	•••
K44			x										••	••••	••••	
K44X			x										••	••••	•••	
16-1Mn			x					x					••••	••••	•••	
16-4Mn													••••	••••	•••	
17-7A													••••	••••	•••	
17-7C													••••	••••	•••	
17-7E													••••	••••	•••	
18-9E													••••	••••	•••	
18-9DDQ													•••••	•••••	•••	
18-10L							1400 MPa max						•••••	•••••	••••	
18-9L							1400 MPa max						••••	•••••	•••	
18-12D							1400 MPa max						•••••	••••	•••	
18-10T							1400 MPa max						••••	•••••	•••	
18-11ML							1400 MPa max						•••••	•••••	••••	
17-11MT							1400 MPa max						••••	•••••	••••	
R20-12													••••	••••	•••	

x

Workable
Please consult
Not workable

(2) : Possible to produce specific tensile strength ranges.
NB : For the ultra-fine thicknesses (<0.10mm) in temper rolled condition, please consult.
••••• : 1 to 6 stars notation to indicate a growing performance level.

Tolerances (in mm) on width according to EN ISO 9445-1 norm

Thicknesses (t) (mm)	Widths (w) (mm)														
	w ≤ 40			40 < w ≤ 125			125 < w ≤ 250			250 < w ≤ 720			w < 1100		
	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	
t < 0.25	+0.17 0	+0.13 0	+0.10 0	+0.20 0	+0.15 0	+0.12 0	+0.25 0	+0.20 0	+0.15 0	+0.50 0	+0.50 0	+0.40 0	+1.50 0	+0.60 0	
0.25 ≤ t < 0.50	+0.20 0	+0.15 0	+0.12 0	+0.25 0	+0.20 0	+0.15 0	+0.30 0	+0.22 0	+0.17 0	+0.60 0	+0.50 0	+0.40 0	+1.50 0	+0.60 0	
0.50 ≤ t < 1.00	+0.25 0	+0.22 0	+0.15 0	+0.25 0	+0.22 0	+0.17 0	+0.40 0	+0.25 0	+0.20 0	+0.70 0	+0.60 0	+0.50 0	+1.50 0		
1.00 ≤ t < 1.50	+0.25 0	+0.22 0	+0.15 0	+0.30 0	+0.25 0	+0.17 0	+0.50 0	+0.30 0	+0.22 0	+1.00 0	+0.70 0	+0.60 0	+1.50 0		
1.50 ≤ t < 2.50	+0.30 0	+0.25 0	+0.20 0	+0.40 0	+0.25 0	+0.20 0	+0.60 0	+0.40 0	+0.25 0	+1.00 0	+0.80 0	+0.60 0	+2.00 0		

NB : These tolerances can either be totally + or totally -; or evenly/unevenly split between the two. The total range of the tolerance must remain as indicated in the table.
Ultra-precision tolerances : please consult.

Aperam Stainless Precision

A tailor-made stainless steel solution for each customer

Aperam Stainless Precision is committed to meeting your needs in terms of proximity and availability.

Through our European sales network, you benefit from a large organisation and the proximity of entities able to respond at all levels.

Sales agencies :

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We will meet your demands with stainless steel solutions.

Please contact our experts to give your requirements and let us work on a tailor-made solution, allowing you to benefit from our long-term experience and support.

Czech Republic / Slovakia

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