


aperam  
made for life

Our offer for automotive exhaust:  
a range of tailored solutions

# Our grades for exhaust

	Grade designations	Standards		
		ASTM designations		EN
		TYPE	UNS	
 <p><b>Ferritic stainless steels</b></p>	<b>K03</b>		S41003	1.4003
	<b>K09X</b>	409	S40900	1.4512
	<b>K33X</b>			1.4513
	<b>K39</b>	439		1.4510
	<b>K39M</b>	430Ti	S43036	1.4510
	<b>K41X</b>	441 <sup>(1)</sup>	S43932	1.4509
	<b>K44</b>	444	S44400	1.4521
	<b>K44X</b> <sup>(2)</sup>	444	S44400	1.4521
<b>Austenitic stainless steel containing manganese</b>	<b>Aperam 201D (17-4Mn)</b>	201.1	S20100 <sup>(3)</sup>	1.4618 <sup>(4)</sup>
<b>Austenitic stainless steels</b>	<b>Aperam 304D (18-9ED)</b>	304	S30400	1.4301
	<b>Aperam 304ED (18-9DDQ)</b> <sup>(5)</sup>	304	S30400	1.4301
	<b>Aperam 304L (18-9L)</b>	304L	S30403	1.4307
	<b>Aperam 321 (18-10T)</b>	321	S32100	1.4541
<b>Heat resisting stainless steel according to EN 10095</b>	<b>Aperam 309 (R20-12)</b>	309	S30908	1.4828

(1) Common designation.

(2) High temperature dedicated grade.

(3) With copper addition and 201.1 "rich side" properties per ASTM A240.

(4) Pending update of the standard.

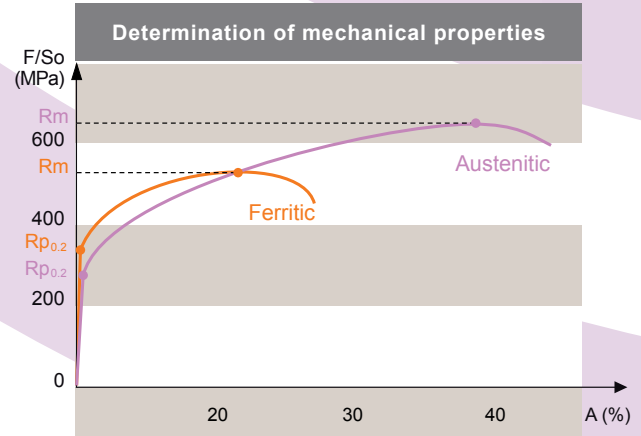
(5) Deep Drawing Quality dedicated grade.

# Chemical analysis

Grade designations	Chemical compositions (in weight %) - (typical values)							
	C	N	Si	Mn	Cr	Mo	Ni	Others
<b>K03</b>	0.020	0.015	0.50	0.60	11.00		0.40	
<b>K09X</b>	0.010	0.010	0.45	0.30	11.30			Ti = 0.19
<b>K33X</b>	0.015	0.015	0.50	0.25	17.30	0.90		Ti = 0.35
<b>K39</b>	0.020	0.015	0.40	0.30	17.50			Ti = 0.35
<b>K39M</b>	0.020	0.015	0.40	0.30	16.50			Ti = 0.40
<b>K41X</b>	0.015	0.015	0.60	0.30	17.80			Ti+Nb = 0.65
<b>K44</b>	0.015	0.020	0.50	0.30	17.70	1.85		Ti+Nb = 0.45
<b>K44X</b>	0.015	0.015	0.40	0.30	19.00	1.90		Nb = 0.60
<b>Aperam 201D (17-4Mn)</b>	0.050	0.10	0.35	6.00	16.80		4.60	Cu = 1.60
<b>Aperam 304D (18-9ED)</b>	0.040	0.055	0.40	1.20	18.20		8.10	
<b>Aperam 304ED (18-9DDQ)</b>	0.045	0.035	0.40	1.10	18.20		9.10	
<b>Aperam 304L (18-9L)</b>	0.025	0.065	0.40	1.40	18.20		8.05	
<b>Aperam 321 (18-10T)</b>	0.025	0.010	0.50	1.10	17.20		9.10	Ti = 0.30
<b>Aperam 309 (R20-12)</b>	0.050	0.030	1.60	1.35	19.30		11.40	

# Mechanical properties

Grade designations	Mechanical properties annealed condition (typical values)		
	Rp <sub>0.2</sub>	Rm	A%
<b>K03</b>	350	490	28
<b>K09X</b>	250	420	32
<b>K33X</b>	300	470	32
<b>K39</b>	300	460	30
<b>K39M</b>	290	450	31
<b>K41X</b>	310	490	30
<b>K44</b>	370	520	29
<b>K44X</b>	370	540	29
<b>Aperam 201D (17-4Mn)</b>	320	660	52
<b>Aperam 304D (18-9ED)</b>	300	630	55
<b>Aperam 304ED (18-9DDQ)</b>	270	610	57
<b>Aperam 304L (18-9L)</b>	300	630	54
<b>Aperam 321 (18-10T)</b>	270	600	50
<b>Aperam 309 (R20-12)</b>	310	640	52



With	
<b>Rm</b>	Ultimate Tensile Strength (UTS) MPa
<b>Rp<sub>0.2</sub></b>	Yield Strength (YS) MPa
<b>A</b>	Elongation (E) % <b>Sample according to ISO 6892-1, part 1:</b> 20x80mm (thickness < 3mm) Lo = 5.65√So (thickness ≥ 3mm) <b>Sample according to ASTM A370:</b> 12.5x50mm
<b>1 MPa</b>	= 1 N/mm <sup>2</sup> = 145 PSI = 0.1kg/mm <sup>2</sup>

# Size range

Grade designations	Thickness (mm)																
	0.5	0.6	0.8	1.0	1.2	1.5	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
<b>K03</b>																	
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<b>K33X</b>																	
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Cold rolled

Hot rolled

## Our comprehensive size range

### Coil - Strip

#### Possibilities according to thickness & width

Thickness in mm	Min width in mm	Max width in mm
$0.5 \leq th < 0.6$	30	1250
$0.6 \leq th < 0.8$	30	1500
$0.8 \leq th < 1.2$	40	1500

#### Other dimensions are possible on request

A large choice of thicknesses is available ranging from 0.5mm to 8mm for ferritics and even 12mm for austenitics and with a choice of widths up to 1500mm for ferritics and even 2000mm for austenitics. Under 0.5mm possible on request.

### Sheets - Blanks

Service centre supply is possible on request

### Logistics offer

"X: the key for just in time deliveries, reliable quality and continuous improvement as required by the automotive market"

# Our offer

## for the exhaust market

We have developed a wide choice of grades to provide you with the solution tailored to your requirement, with:

**KARA**, our comprehensive range of nickel-free ferritic stainless steels, for:

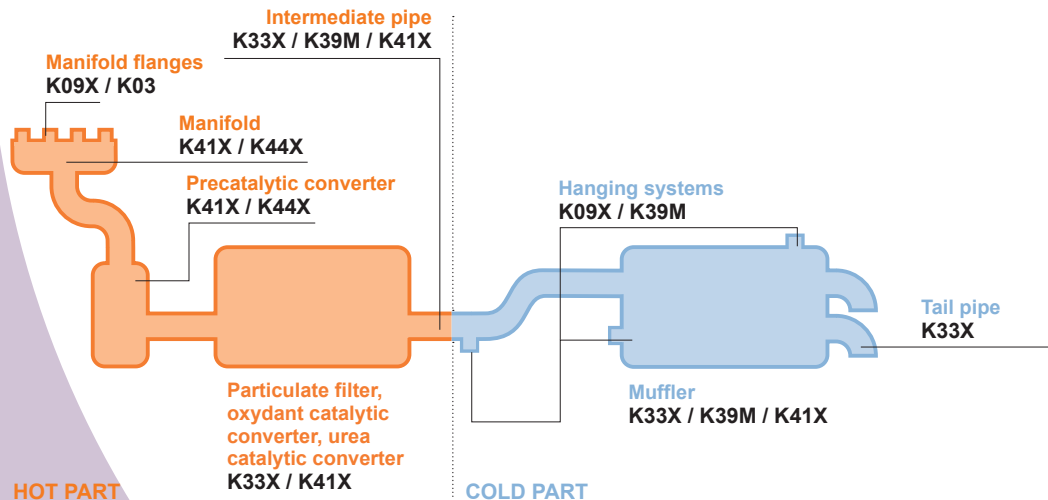
- **Heat-resistance and durability** (manifolds, catalytic converters) with our niobium-stabilised grades
- **Pollution reduction solutions** (DPF, SCR, EGR) with our 17% chromium, molybdenum, titanium and/or niobium stabilized grade
- **Resistance to internal and external corrosion** (mufflers), with our dual-stabilised and molybdenum grades to resist corrosive condensates and road salt.

These grades are offered in a wide range of thicknesses, from 0.5mm for double skins to 12mm for your flanges.

**Austenitic stainless steels**, our traditional offer for very deep drawing applications.

**The new 17-4Mn**, our chromium-manganese austenitic stainless steel offer with a reduced nickel content.

The stainless steel exhaust system.



# Our commitments

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to ensure your projects' success

## > Understanding what you really need

Since stainless steel started to be used in exhaust systems, we have been focussing on your requirements and developing solutions best suited to your needs.

## > Ongoing support

As European leader in the exhaust market, we can guarantee responsive technical support, access to our latest innovations and a close partnership, including co-development of your solutions.

## > Our expertise is at your disposal

We rely upon the long recognized expertise of our research centre in the fields of forming, corrosion, welding, heat-resistance and numerical simulation.

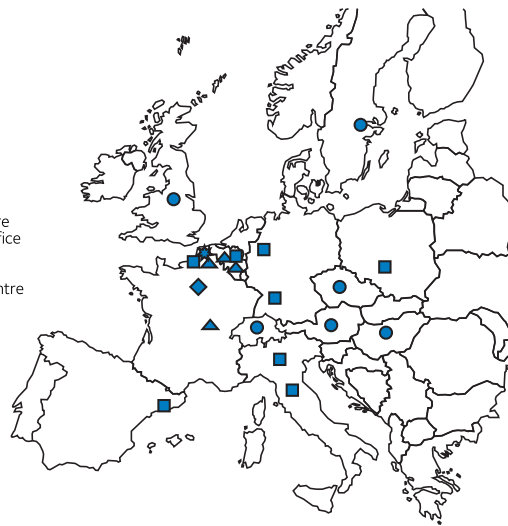
## > Providing you with the best service

We combine flexibility and responsiveness thanks to a comprehensive logistics offer, with direct deliveries or via our service centres located close to your plants, everywhere in Europe.

# Contacts

## Flat Products

- ◆ Head office
- ▲ Plant
- Service centre and Sales Office
- Sales office
- ★ Research Centre



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