

Ferritic Stainless steel advantages for condensing gas boilers

What is ferritic stainless ?

KARA is the Aperam brand for ferritic stainless solutions.

- > Ferritic stainless steel contains at least 10.5% chromium (as other stainless steels) but does not contain nickel.
- > By choosing ferritic, you can avoid the erratic price fluctuations of the nickel and benefit from more price stability.
- > Ferritic like other stainless steels continually protects itself thanks to a passive layer of chrome which forms naturally on the surface.
- > Ferritic stainless is magnetic. There is no link between magnetism and corrosion, the proof being duplex grades (austeno-ferritic) which offer excellent corrosion resistance and which are also magnetic.

KARA
key for value



Ferritic Stainless Advantages K41 (1.4509)

Mechanical and physical properties

- > K41 advantages: low expansion coefficient, high proof stress.
- > Retains mechanical properties at 100°C.
- > Its dual stabilization retains the mechanical properties in the weld bead areas of the HAZ (heat-affected zone).
- > stainless steel has good insulation properties: interesting for tubes connections.

Recyclability

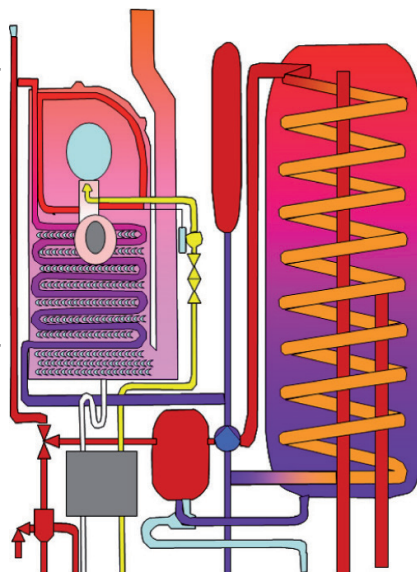
- > Stainless steel is the «green material» par excellence, infinitely recyclable, neutral in relation to the environment and when in contact with elements such as water, there is no leaching of elements which could alter their composition.

Health & Hygiene

- > Stainless has good corrosion resistance at 80°C enabling good resistance to certain cases of legionnaires disease and scale reduction.
- > Stainless complies with all of the food-safe norms and can be used in contact with drinking water.
- > Giving off no harmful fumes at high temperatures.

Heat Resistance

- > The addition of Niobium enables continued high temperature oxidation resistance, thermal fatigue resistance and creepresistance. K41 has superior performance to refractory steels in respect of these criteria.



Resistance to corrosion

- > Its resistance to aggressive boiler condensates is better than other recently used materials.
- > Like all ferritic grades, K41 is not susceptible to stress corrosion.
- > Dual stabilisation with titanium and niobium affords K41 excellent resistance to intergranular corrosion.

Transformation and maintenance

- > Boiler maintenance is greatly facilitated by the K41 surface finish.
- > Stainless steel can be welded, drawn, folded, suitable for adhesive bonding and hydroformed.

The appropriate grade

K41 is a Niobium & Titanium stabilised ferritic grade, containing 18% chromium.

For many years, the K41 grade has been approved for automotive exhaust and we have capitalised on this experience for the gas boiler applications.

K41 is the optimised choice, confirmed by results of many trials from our R&D Center of Isbergues and several demonstration projects.

For welding and drawing, please refer systematically to the K41 technical data sheet.

Chemical Composition

Elements	C	Si	Mn	Cr	Ti+Nb
%	0.015	0.6	0.30	17.80	0.65

Typical Values

European designation		American designation
X2CrTiNb18	1.4509 ⁽¹⁾	UNS 43932, Type 441 ⁽²⁾ UNS 43940, Type 441 ⁽²⁾

(1) According to NF EN 10088-2

(2) According to ASTM A 240

Properties

Properties (typical values)	K41
Density (kg/dm ³)	7.7
Melting temperature in °C	1505
Young's modulus in MPa x 10 ³ (20°C)	220
Yield Strength in MPa at 20°C	310
Thermal conductivity in W/m.K	25
Mean Thermal expansion coefficient 10 ⁻⁶ /K; 20-200°C	11
Ultimate tensile strength Rm in MPa at 20°C	480

Product range

Forms : sheets, blanks, coils, strip, circles.

Thicknesses : 0,4 to 2 mm (from 2 to 6,5 mm, consult us).

Width : according to thickness, consult us.

Finishes : cold-rolled, hot-rolled according to thickness.

(other finishes, please consult us).

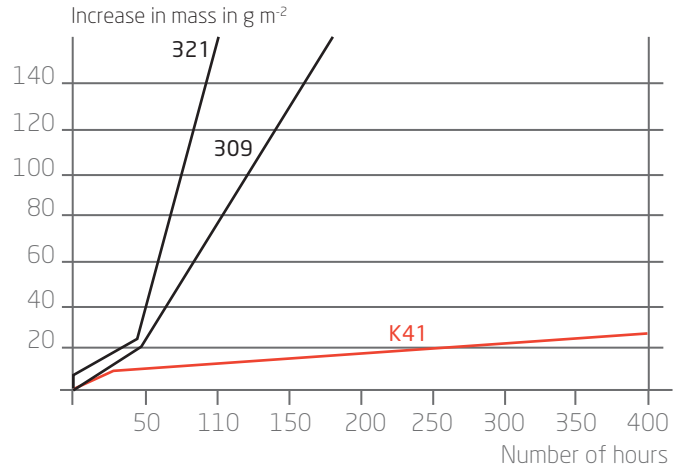
For tubes sizes, please consult us:

<http://www.aperam.com/precision/en/who-are-we/the-aperams-group.html>

<http://www.aperam.com/services-2/tubes-europe/stainless-tubes-europe-2>

Resistance to cyclic oxidation

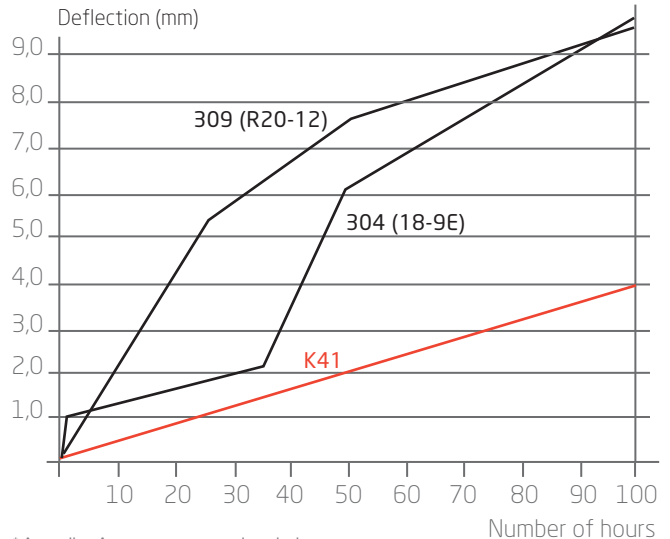
K41 performance at 950 °C during 400 hours



Resistance to creep

Creep characteristics

Sag-Test à 950°C* (thickness 2 mm)



* According Aperam process and analysis