

# Core 434/4113

EN 1.4113, ASTM 434 / UNS S43400

## General characteristics

Outokumpu Core 434/4113 is a 1% molybdenum-alloyed ferritic stainless steel with medium chromium and normal carbon content, which can be used in many corrosive environments, such as at the cold end of automotive exhaust systems. After tensile elongation, Core 434/4113 may be prone to the ridging-surface phenomenon.

## Typical applications

- Automotive trim fittings

## Products & dimensions

### Cold rolled products, available dimensions (mm)

Surface finish		Coil / Strip		Plate / Sheet	
		Thickness	Width	Thickness	Width
2B	Cold rolled, heat treated, pickled, skin passed	0.30-3.58	12-1524	0.30-3.58	18-1524
2BB	Bright-pickled	0.30-3.50	30-1500	0.30-3.50	600-1500
2C	Cold rolled, heat treated	0.80-3.50	30-1530		
2E	Cold rolled, heat treated, mech. desc. pickled	0.33-3.58	12-1530	0.33-3.58	18-1524
2F	Cold rolled, heat treated, skin passed	0.33-3.58	12-1524	0.33-3.58	18-1524
2G	Ground	0.30-3.58	12-1530	0.30-3.58	18-1530
2J	Brushed or dull polished	0.30-3.00	30-1530	0.30-3.00	600-1530
2K	Satin finish	0.53-3.58	12-1524	0.53-3.58	18-1524
2R	Cold rolled, bright annealed	0.05-3.00	3-1300	0.30-3.00	18-1300

Surface finish		Coil / Strip		Plate / Sheet	
		Thickness	Width	Thickness	Width
1C	Hot rolled, heat treated, not descaled	2.00-8.00	50-1550		
1D	Hot rolled, heat treated, pickled	2.50-6.36	50-1524	2.50-6.36	350-1524
1G	Ground	2.00-3.00	750-1455	2.00-3.00	750-1455
1U	Black hot rolled	2.00-8.00	50-1550		

## Chemical composition

The typical chemical composition for this grade is given in the table below, together with composition limits given for the product according to different standards. The required standard will be fully met as specified on the order.

The chemical composition is given as % by mass.

	C	Mn	Cr	Ni	Mo	N	Other
<b>Typical</b>	<b>0.05</b>		<b>16.5</b>		<b>1.0</b>		
ASME II A SA-240	≤0.12	≤1.00	16.0-18.0		0.75-1.25		
ASTM A240	≤0.12	≤1.00	16.0-18.0		0.75-1.25		
ASTM A240	≤0.12	≤1.00	16.00-18.00		0.75-1.25		
EN 10088-2	≤0.08	≤1.0	16.0-18.0		0.9-1.4		

## Corrosion resistance

Outokumpu Core 434/4113 has good corrosion resistance in solutions of many halogen-free organic and inorganic compounds over a wide temperature and concentration range. It can withstand many sufficiently diluted organic and mineral acids depending on the temperature and concentration of the solution. Core 434/4113 may suffer from uniform corrosion in strong organic and mineral acids, as well as in hot concentrated alkaline solutions. If sensitized for intergranular corrosion due to welding or an inappropriate heat treatment, corrosion rates in certain environments may be significantly higher.

In aqueous solutions containing halogenides, e.g. chlorides or bromides, pitting and crevice corrosion may occur depending on the halogenide concentration, temperature, pH-value, concentration of oxidizing compounds, or crevice geometry, if applicable. The presence of corrosion inhibiting or accelerating compounds like e.g. transition metal ions or organic compounds may influence the corrosion behavior of Core 434/4113. Due to its ferritic crystal structure, Core 434/4113 is not prone to chloride-induced stress corrosion cracking.

Core 434/4113 can be used for indoor and outdoor applications in rural areas and urban environments where chloride contamination is low. The best material performance is typically achieved with the help of adequate design, correct post-weld treatment and regular cleaning during use (if applicable).

The maximum service temperature of Core 434/4113 in dry air is 800 °C. The presence of other corrosive compounds in the hot environment like water or sulfur compounds may reduce the maximum service temperature significantly.

For more information on corrosion resistance, please refer to the Outokumpu Corrosion Handbook or contact the our experts.

Pitting corrosion resistance		Crevice corrosion resistance
PRE	CPT	CCT
20	<10	<0

Pitting Resistance Equivalent (PRE) is calculated using the following formula:  $PRE = \%Cr + 3.3 \times \%Mo + 16 \times \%N$

Corrosion Pitting Temperature (CPT) as measured in the Avesta Cell (ASTM G 150), in a 1M NaCl solution (35,000 ppm or mg/l chloride ions).

Critical Crevice Corrosion Temperature (CCT) is obtained by laboratory tests according to ASTM G 48 Method F

For a more detailed description of their corrosion resistance properties in different environments see Outokumpu Corrosion Handbook.

# Mechanical properties

Cold rolled coil and sheet	R <sub>p0.2</sub> MPa	R <sub>p1.0</sub> MPa	R <sub>m</sub> MPa	Elongation <sup>1)</sup> %	Impact strength J	Rockwell	HB	HV
<b>Typical (thickness 1 mm)</b>	<b>390</b>	<b>420</b>	<b>550</b>					
ASME II A SA-240	≥ 240		≥ 450					
ASTM A240	≥ 240		≥ 450					
ASTM A240	≥ 240		≥ 450			≤ 89HRB		

Hot rolled coil and sheet	R <sub>p0.2</sub> MPa	R <sub>p1.0</sub> MPa	R <sub>m</sub> MPa	Elongation <sup>1)</sup> %	Impact strength J	Rockwell	HB	HV
ASME II A SA-240	≥ 240		≥ 450					
ASTM A240	≥ 240		≥ 450					

Hot rolled quarto plate	R <sub>p0.2</sub> MPa	R <sub>p1.0</sub> MPa	R <sub>m</sub> MPa	Elongation <sup>1)</sup> %	Impact strength J	Rockwell	HB	HV
ASME II A SA-240	≥ 240		≥ 450					
ASTM A240	≥ 240		≥ 450					

<sup>1)</sup>Elongation according to EN standard:

A<sub>80</sub> for thickness below 3 mm.

A for thickness = 3 mm.

Elongation according to ASTM standard A<sub>2</sub> or A<sub>50</sub>.

# Physical properties

Density	Modulus of elasticity	Thermal exp. at 100 °C	Thermal conductivity	Thermal capacity	Electrical resistance	Magnetizable
kg/dm <sup>3</sup>	GPa	10 <sup>-6</sup> /°C	W/m°C	J/kg°C	μΩm	
7.7	220	10,0	25	460	0.70	Yes

# Fabrication

More detailed information concerning welding procedures can be obtained from the Outokumpu Welding Handbook, available from our sales offices.

# Standards & approvals

Standard	Designation
ASME SA-240M Code Sect. II. Part A	UNS S43400 / 434
ASTM A240/A240M	UNS S43400 / 434; UNS S43400 / 434
EN 10088-2	1.4113

# Contacts & Enquiries

Contact your nearest sales office

[www.outokumpu.com/contacts](http://www.outokumpu.com/contacts)

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