

Moda 410S/4000

EN 1.4000, ASTM TYPE 410S / UNS S41008

General characteristics

Outokumpu 4000 is a ferritic chromium stainless steel and common features of the ferritic steel grades are:

- Good formability, especially at deep drawing applications
- Not susceptible to stress corrosion cracking
- Higher heat conductivity compared to austenitics
- Rather low heat expansion coefficient
- Supplied with a range of functional and aesthetic surface finishes

Typical applications

Typical applications can include mining equipment, petroleum and petrochemical equipment, press plates and thermal process equipment.

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	0.33-3.58	12-1524	0.33-3.58	18-1524
2BB	Bright-pickled	0.30-4.00	30-1530	0.30-4.00	350-1530
2C	Cold rolled, heat treated	0.80-3.00	30-1530		
2D	Cold rolled, heat treated, pickled	0.80-4.00	30-1530	0.30-4.00	350-1530
2E	Cold rolled, heat treated, mech. desc. pickled	0.33-4.00	12-1530	0.33-4.00	18-1530
2G	Ground	0.50-3.00	30-1500	0.50-3.00	350-1530
2J	Brushed or dull polished	0.50-3.00	30-1500	0.50-3.00	350-1530
2R	Cold rolled, bright annealed	0.05-3.00	3-1250	0.40-3.00	350-1250

Continuous hot rolled products, available dimensions (mm)

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	3.00-6.36	50-1524	3.00-6.36	350-1524
1G	Ground	2.00-3.00	750-1455	2.00-3.00	750-1530
1U	Black hot rolled	2.00-8.00	50-1550		

Chemical composition

The typical chemical composition is shown in the table below.

	C	Mn	Cr	Ni	Mo	N	Other
Typical	0.03		12.5				
ASME II A SA-240	≤0.08	≤1.00	11.5-13.5	≤0.60			
ASTM A240	≤0.08	≤1.00	11.5-13.5	≤0.60			
EN 10088-2	≤0.08	≤1.0	12.0-14.0				
EN 10088-3	≤0.08	≤1.0	12.0-14.0				

Corrosion resistance

For more information see Outokumpu Corrosion Handbook.

Pitting corrosion resistance		Crevice corrosion resistance
PRE	CPT	CCT
13	<10	<0

PRE Pitting Resistant Equivalent calculated using the formula: $PRE = \%Cr + 3.3 \times \%Mo + 16 \times \%N$

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

CCT Critical Crevice Corrosion Temperature is the critical crevice corrosion temperature which is obtained by laboratory tests according to ASTM G 48 Method F

Mechanical properties

The mechanical properties of the available products are given in the table below.

Cold rolled coil and sheet	R _{p0.2} MPa	R _{p1.0} MPa	R _m MPa	Elongation ¹⁾ %	Impact strength J	Rockwell	HB	HV
Typical (thickness 1 mm)	320	340	440					
ASME II A SA-240	≥ 205		≥ 415				≤ 183	
ASTM A240	≥ 205		≥ 415			≤ 89HRB	≤ 183	
EN 10088-2	≥ 240		400 - 600	≥ 19				

Hot rolled coil and sheet	R _{p0.2} MPa	R _{p1.0} MPa	R _m MPa	Elongation ¹⁾ %	Impact strength J	Rockwell	HB	HV
Typical (thickness 4 mm)	300	325	430	35			74	
ASME II A SA-240	≥ 205		≥ 415				≤ 183	
ASTM A240	≥ 205		≥ 415				≤ 183	
EN 10088-2	≥ 220		400 - 600	≥ 19				

Hot rolled quarto plate	R _{p0.2} MPa	R _{p1.0} MPa	R _m MPa	Elongation ¹⁾ %	Impact strength J	Rockwell	HB	HV
Typical (thickness 15 mm)	270	320	490	30				
ASME II A SA-240	≥ 205		≥ 415				≤ 183	
ASTM A240	≥ 205		≥ 415				≤ 183	
EN 10088-2	≥ 230		400 - 600	≥ 19				

¹⁾Elongation according to EN standard:

A₈₀ for thickness below 3 mm.

A for thickness = 3 mm.

Elongation according to ASTM standard A₂ or A₅₀.

Physical properties

Data according to EN 10088, EN 10095 or typical values.

Density kg/dm ³	Modulus of elasticity GPa	Thermal exp. at 100 °C 10 ⁻⁶ /°C	Thermal conductivity W/m°C	Thermal capacity J/kg°C	Electrical resistance μΩm	Magnetizable
7.7	220	10,5	30	460	0.60	Yes

Fabrication

Welding

Outokumpu 4000 is sensitive to grain growth since less martensite is formed compared to similar grades. For this reason, low heat input shall be used. Austenitic fillers are most common, but at service temperatures above 450°C, a nickel-base filler of EN ISO 6082 type is advantageous. The shielding gas for MAG should be based on Ar/He, mixed with some oxygen to improve arc stability.

Standards & approvals

The most commonly used international product standards are given in the table below.

Standard	Designation
ASME SA-240M Code Sect. II. Part A	TYPE 410S / UNS S41008
ASTM A240/A240M	TYPE 410S / UNS S41008
EN 10088-2	1.4000
EN 10088-3	1.4000

Contacts & Enquiries

Contact your nearest sales office

www.outokumpu.com/contacts

Working towards forever.

We work with our customers and partners to create long lasting solutions for the tools of modern life and the world's most critical problems: Clean energy, clean water and efficient infrastructure. Because we believe in a world that lasts forever.

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