

Moda 430/4016

EN 1.4016, ASTM TYPE 430 / UNS S43000

General characteristics

Moda 430/4016 is a classic 16% chromium ferritic stainless steel. Good corrosion resistance in mildly corrosive environments combined with good formability have made this product one of the most used non-hardenable ferritics, especially in indoor environments.

Typical applications

- Kitchen equipment
- Household appliances
- Sinks
- Flanges and valves

Products & dimensions

Cold rolled products, available dimensions (mm)

Surface finish		Coil / Strip		Plate / Sheet	
		Thickness	Width	Thickness	Width
2A	2A	0.50-1.00	35-1280	0.50-1.00	35-1280
2B	Cold rolled, heat treated, pickled, skin passed	0.30-5.00	12-1530	0.30-5.00	18-1530
2BB	Bright-pickled	0.25-3.50	30-1524	0.25-3.50	35-1530
2C	Cold rolled, heat treated	0.50-5.00	30-1530	0.50-0.79	35-1250
2D	Cold rolled, heat treated, pickled	0.30-3.00	30-1530	0.50-3.50	35-1530
2E	Cold rolled, heat treated, mech. desc. pickled	0.33-5.00	12-1530	0.33-5.00	18-1530
2F	Cold rolled, heat treated, skin passed	0.33-3.58	12-1524	0.33-3.58	18-1524
2G	Ground	0.30-4.01	12-1530	0.40-4.01	18-1530
2H	Work hardened	0.05-5.00	3-1530	0.30-5.00	18-1530
2J	Brushed or dull polished	0.30-3.00	30-1530	0.40-3.00	35-1530
2K	Satin finish	0.53-3.58	12-1530	0.53-3.58	18-1530
2M	Patterned	0.40-3.50	30-1524	0.40-3.50	600-1500
2R	Cold rolled, bright annealed	0.05-3.00	3-1500	0.20-3.50	18-1500

Continous 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	2.00-8.00	50-1550	2.50-8.00	350-1524
1E	Hot rolled, heat treated, mech. desc.	1.50-3.00	50-1530	1.50-3.00	50-1530
1G	Ground	2.00-3.00	750-1455	2.00-3.00	750-1455
1H	Hot rolled, temper rolled	2.00-2.50	35-1530		
1M	Patterned	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
Typical	0.05		16.2				
ASTM A240	≤0.12	≤1.00	16.0-18.0	≤0.75			
EN 10088-2	≤0.08	≤1.0	16.0-18.0				
EN 10088-3	≤0.08	≤1.00	16.0-18.0				
EN 10088-4	≤0.08	≤1.0	16.0-18.0				

Corrosion resistance

Moda 430/4016 provides good corrosion resistance in fresh water, steam, mild acids and bases, as well as in oxidizing acids (e.g. nitric acid). It performs best with a smooth surface finish (e.g. polished or buffed).

Like all ferritic grades, Moda 430/4016 is not susceptible to chloride-induced stress corrosion cracking. Resistance to pitting and crevice corrosion is lower than that of austenitic chromium-nickel stainless grades. Moda 430/4016 resists intergranular attack only in the as-delivered condition, not after local heat input e.g. through welding.

The relatively high chromium content of Moda 430/4016 contributes to good oxidation resistance, also in intermittent service. In continuous service the maximum scaling temperature is about 815 °C.

Pitting corrosion resistance		Crevice corrosion resistance
PRE	CPT	CCT
16	<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 detailed information please refer to Outokumpu Corrosion Handbook or contact Outokumpu.

Mechanical properties

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)	365	390	520	50				
ASTM A240	≥ 205		≥ 450			≤ 89HRB	≤ 183	

EN 10088-2			430 - 600	≥ 20				
EN 10088-4								

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)	370	395	515	21			80	
ASTM A240	≥ 205		≥ 450				≤ 183	
EN 10088-2			240 - 260	≥ 18				
EN 10088-4								

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)	365		505	20				
ASTM A240	≥ 205		≥ 450				≤ 183	
EN 10088-2	≥ 260		430 - 630					
EN 10088-4	≥ 260		430 - 630					

Wire rod	R _{p0.2} MPa	R _{p1.0} MPa	R _m MPa	Elongation ¹⁾ %	Impact strength J	Rockwell	HB	HV
Typical	280		450	25				

¹⁾ Elongation according to EN 10088-2:

A₈₀ for thickness < 3 mm

A for thickness ≥ 3 mm

Elongation according to ASTM A240:

A₈₀ or A

Physical properties

Data according to EN 10088-1.

Density	Modulus of elasticity	Thermal exp. at 100 °C	Thermal conductivity	Thermal capacity	Electrical resistance	Magnetizable
kg/dm ³	GPa	10 ⁻⁶ /°C	W/m°C	J/kg°C	μΩm	
7.7	220	10	25	460	0.60	Yes

Fabrication

Forming

Moda 430/4016 is readily cold formed by, for example, bending, deep drawing, stretch forming, and upsetting. Due to its lower work hardening rate in comparison with austenitic stainless steels, forming requires less force, but severe forming operations should be avoided since ferritic grades are less ductile than austenitics. In some cases an intermediate anneal between forming steps could be required.

Furthermore, the cold formability of ferritics is largely dependent on material thickness and forming temperature because they are subject to low temperature brittleness. Cold forming of flat material thicker than 5 mm or > 15 mm diameter rounds is not recommended.

When bending ferritic sheet material it is advised that the bend radius is at least twice the sheet thickness and the bend axis at right angle to the rolling direction.

Machining

Moda 430/4016 is relatively easy to machine. Compared to austenitic grades, it has a lower tendency to build up edges, which in turn renders a larger machining window. Since the machinability is comparable to that of structural carbon steels, the same recommendations regarding choice of tool, cutting speed, and cutting feed apply.

Welding

Moda 430/4016 is considered to be weldable with certain limitations. Basically the common fusion and resistance techniques can be applied, but expert consultation is advised. When cooling down from temperatures above 900 °C sensitization to intergranular corrosion attack is likely. In addition, grain coarsening and martensite formation lead to embrittlement of the weld and HAZ. This is due to the high carbon content of Moda 430/4016 and missing stabilizing elements (Nb, Ti).

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

Standards & approvals

This stainless steel grade is covered by the following standards and approvals:

Standard	Designation
ASTM A240/A240M	TYPE 430 / UNS S43000
EN 10088-2	1.4016
EN 10088-3	1.4016
EN 10088-4	1.4016

List is not exhaustive.

Contacts & Enquiries

[Contact your nearest sales office](#)

www.outokumpu.com/contacts

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