

Moda 4589

EN 1.4589

General characteristics

Moda 4589 is a 14% chromium product with a small amount of niobium for elevated strength, making it suitable for structural parts exposed to loads that demand higher yield points.

Moda 4589 is a structural medium-chromium martensitic-ferritic stainless steel with enhanced wear resistance. Due to its chromium content and its molybdenum alloying, it can be used in many mildly corrosive environments. Because of its titanium content, Moda 4589 can be welded in all dimensions without becoming susceptible to intergranular corrosion.

Typical applications

- Conveyor chains
- Railroad cars

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	0.60-6.00	30-1250	0.60-4.00	350-1250
2BB	Bright-pickled	0.70-3.50	30-1250	0.70-3.50	600-1250
2C	Cold rolled, heat treated	0.80-5.00	30-1250		
2D	Cold rolled, heat treated, pickled	0.70-6.00	30-1250	0.70-6.00	600-1250
2E	Cold rolled, heat treated, mech. desc. pickled	0.70-6.00	30-1250	0.70-6.00	600-1250
2G	Ground	0.70-3.00	30-1250	0.70-3.00	600-1250
2H	Work hardened	0.05-6.00	3-1250	0.70-5.00	600-1500
2J	Brushed or dull polished	0.70-3.00	30-1250	0.70-3.00	600-1250
2R	Cold rolled, bright annealed	0.05-1.50	3-649		

Continuous hot rolled products, available dimensions (mm)

	Coil / Strip	Plate / Sheet
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Surface finish		Thickness	Width	Thickness	Width
1C	Hot rolled, heat treated, not descaled	2.00-8.00	50-1530		
1D	Hot rolled, heat treated, pickled	3.50-7.00	30-1250	3.50-7.00	350-1250
1G	Ground	2.00-3.00	750-1530	2.00-3.00	750-1530
1U	Black hot rolled	2.00-8.00	50-1530		

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		14.0	1.7	0.3		Ti
EN 10088-2	≤0.08	≤1.00	13.5-15.5	1.00-2.50	0.20-1.20		Ti

Corrosion resistance

Moda 4589 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. Moda 4589 may suffer from uniform corrosion in strong organic and mineral acids as well as in hot concentrated alkaline solutions.

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, and 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 Moda 4589.

Moda 4589 can be used for indoor applications in environments where chloride contamination is low. The best material performance is usually reached with the help of adequate design, correct post-weld treatment, and regular cleaning during use (if applicable).

Due to its titanium content, the risk of sensitization to intergranular corrosion is strongly reduced when compared to non-stabilized ferritic grades.

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

Pitting corrosion resistance		Crevice corrosion resistance
PRE	CPT	CCT
15	<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

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)	470	510	600					

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)	510	550	650	12			290	

¹⁾Elongation according to EN standard:

A₈₀ for thickness below 3 mm.

A for thickness = 3 mm.

Elongation according to ASTM standard A₂^o or A₅₀.

Physical properties

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	25	460	0.60	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
EN 10088-2	1.4589

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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