outokumpu
high performance stainless steel

Core 4622

EN 1.4622, ASTM UNS S44330

General characteristics

Core 4622 is a nickel-free, high-chromium (21Cr) ferritic stainless steel with equal corrosion resistance to Core 304/4301. Core 4622 has excellent deep drawability and is almost ridging free, meaning it is easier to polish and has a lower overall production cost.

Core 4622 is a 21% chromium ferritic stainless steel, which can be used in many corrosive environments. Because of its titanium and niobium alloying, Core 4622 can be welded in all dimensions without becoming susceptible to intergranular corrosion. It is possible to use Core 4622 at elevated temperatures, like for instance in automotive exhaust systems. Core 4622 can be supplied with a wide range of functional and aesthetic surface finishes.

Typical applications

- Household, catering and architectural applications (indoor and outdoor)
- Tubular products for automotive and process industries
- Tanks and 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	0.50-3.00	35-1550	0.50-3.00	400-1550
2G	Ground	0.50-3.00	35-1550	0.50-3.00	1000-1550
2K	Satin finish	0.50-3.00	35-1550	0.50-3.00	400-1550

Continous hot rolled products, available dimensions (mm)

Surface finish		Coil / Strip		Plate / Sheet	
		Thickness	Width	Thickness	Width
1E	Hot rolled, heat treated, mech. desc.	3.00-5.50	50-1550	3.00-5.50	450-1550

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	**0.02**		**21**			**0.02**	**Cu:0.4 Ti Nb**
ASME II A SA-240	≤0.025	≤1.00	20.0-23.0			≤0.025	Cu:0.30-0.80
ASTM A240	≤0.025	≤1.00	20.0-23.0			≤0.025	Cu:0.30-0.80
EN 10028-7	≤0.030	≤0.80	20.0-24.0			≤0.030	Cu:0.30-0.80 Ti Nb

Corrosion resistance

Core 4622 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 4622 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. For a short period of time, for instance during cooking of food in stainless steel dishes, Core 4622 can tolerate even relatively high chloride concentrations. The presence of corrosion inhibiting or accelerating compounds like transition metal ions or organic compounds may influence the corrosion behavior of Core 4622. Due to its ferritic crystal structure, Core 4622 is not prone to chloride-induced stress corrosion cracking.

Core 4622 can be used for indoor and outdoor applications in rural areas and urban 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 and niobium content, the risk of sensitization to intergranular corrosion is strongly reduced when compared to non-stabilised ferritic grades. Core 4622 can be used in the temperature range in which chromium carbides would precipitate in non-stabilised ferritic grades. Its maximum service temperature in dry air is 950 °C. The presence of other corrosive compounds in the hot atmosphere 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 our corrosion experts.

Pitting corrosion resistance		Crevice corrosion resistance
PRE	CPT	CCT
21		

Pitting Resistance Equivalent (PRE) is calculated using the following formula: PRE = %Cr + 3.3 x %Mo + 16 x %N
Critical 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	$R_{p0.2}$ MPa	$R_{p1.0}$ MPa	R_m MPa	Elongation[1] %	Impact strength J	Rockwell	HB	HV
Typical (thickness 1 mm)	**360**	**365**	**470**					
ASME II A SA-240	≥ 205		≥ 390				≤ 187	
ASTM A240	≥ 205		≥ 390			≤ 90HRB	≤ 187	
EN 10028-7	≥ 300		430 - 630	≥ 22				

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)	**355**	**365**	**470**					
ASME II A SA-240	≥ 205		≥ 390				≤ 187	
ASTM A240	≥ 205		≥ 390				≤ 187	

Hot rolled quarto plate	$R_{p0.2}$ MPa	$R_{p1.0}$ MPa	R_m MPa	Elongation[1] %	Impact strength J	Rockwell	HB	HV
ASME II A SA-240	≥ 205		≥ 390				≤ 187	
ASTM A240	≥ 205		≥ 390				≤ 187	

[1]Elongation according to EN standard:
A_{80} for thickness below 3 mm.
A for thickness = 3 mm.
Elongation according to ASTM standard $A_{2"}$ or A_{50}.

Physical properties

The crystal structure is ferritic, and therefore material is ferromagnetic as soft annealed condition.

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	21	460	0.65	Yes

Fabrication

Core 4622 can be formed using typical forming processes like folding, bending, drawing, etc. Grade has slightly higher yield strength than standard austenitic stainless steel grade 1.4301/AISI 304 in combination with lower work hardening.

Due to the stabilization, its R-value is higher compared to non-stabilized ferritic stainless steel. These characteristics mean excellent deep-drawability.

Welding

Conventional welding methods (like MMA, MIG, MAG, TIG, SAW, LBW or RSW) except gas welding are applicable. Austenitic 19 12 3 L (316L) filler metals can be used.

Shielding gases should be Ar/He based, mixed with maximum of 2% oxygen to improve the arc stability. Hydrogen and nitrogen additions are forbidden.

Heat input should be minimized to reduce the grain growth in the heat-affected-zone.

Stabilization prevents sensitization in the welds.

In order to fully restore the corrosion resistance of the weld seam, the weld discoloration should be removed by pickling, and passivation.

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

Standards & approvals

Core 4622 is a trademark of Outokumpu. Its EN number is 1.4622 and the grade fulfills ASTM UNS S44330 requirements. Work is in progress for further EN standardization.

Standard	Designation
ASME SA-240M Code Sect. II. Part A	UNS S44330
ASTM A240/A240M	UNS S44330
EN 10028-7, PED 2014/68/EU	1.4622

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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