Industeel

ArcelorMittal

SOLEIL™ B2

SOLEIL™ B2: A 13% chromium ferritic stainless steel

This grade presents improved corrosion resistance properties when compared to CMn steels.
It presents also attractive combination of wear and corrosion resistance.

PROPERTIES

STANDARDS

> EURONORM EN 1.4000 X6Cr13

> ASTM/ASME A240/SA240 Type 410S - UNS S41008

CHEMICAL ANALYSIS - WEIGHT %

Typical values

C	Mn	Si	S	P	Cr	Ni
≤ .08	≤ 1	≤ 1	≤ .015	≤ .04	12/13.5	≤ .6

PHYSICAL PROPERTIES

Density: 7.7 kg/dm^3

Interval temperature °C (°F)	Thermal expansion (αx10^{-6} K^{-1})	T °C (°F)	Resistivity (µΩ.cm)	Thermal conductivity (W.m^{-1}.K^{-1})	Young modulus E (GPa)	Shear modulus G (GPa)
20-100 (68-212)	10.5	20 (68)	60	30	220	83.5
20-300 (68-572)	11.5					
20-500 (68-932)	12					

MECHANICAL PROPERTIES

After annealing 750 - 800°C (1382 - 1472°F) - air cooling

Temperature	Y.S. 0.2%		UTS		El	Hardness
	MPa	ksi	MPa	ksi	% min	(HB)
20°C (68 °F)	≥ 245	≥ 36	≥ 440	≥ 64	≥ 20	≤ 200
100°C (212 °F)	≥ 220	≥ 32	≥ 400	≥ 58	≥ 20	
200° C (392 °F)	≥ 210	≥ 30	≥ 370	≥ 54	≥ 51	
300°C (572 °F)	≥ 200	≥ 29	≥ 350	≥ 28	≥ 17	
400 °C (752 °F)	≥ 190	≥ 28	≥ 300	≥ 26	≥ 44	

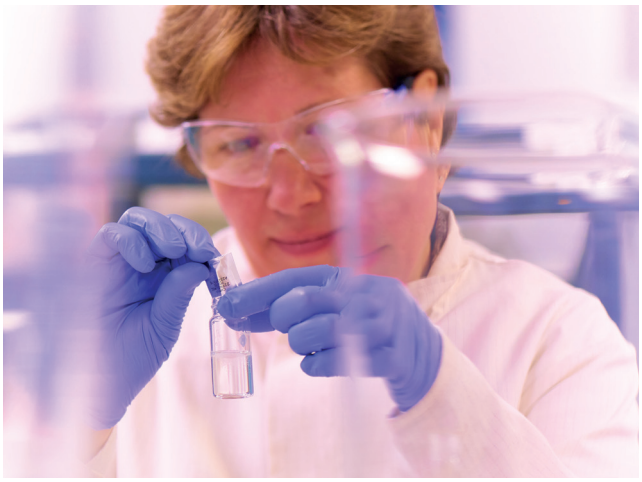
STRUCTURE

Thanks to its low carbon content, Soleil™ B2 presents a 100% ferritic microstructure. It is a magnetic steel.

IN SERVICE CONDITIONS

CORROSION

Soleil™ B2 (410S-1.4000) grade with 13% chromium presents improved corrosion resistance properties when compared to C-Mn steels. This is the case for their use in weak or diluted acids, slightly chlorinated water and desaereted water. Nevertheless the grade is susceptible to chloride attack particularly in oxidising environments. Higher alloying grades are then to be considered.
This grade can be a good candidate for oil and gas applications under low H_2S condition such as in the refining industry. According to the standard NACE MR0175/ISO 15156 it can be used up to 0.1 bar H_2S and pH ≥ 3.5. The grade exhibits attractive combination of wear and corrosion resistance properties.



DELIVERY CONDITIONS

SIZE RANGE

	Quarto plates	Clad plates
Thickness	5 to 130 mm* 3/16" to 5.11"	6 to 126 mm* 1/4" to 5"
Width	Up to 4200 mm* Up to 165"	Up to 3200 mm* Up to 126"
Length	Up to 16000 mm Up to 630 ft	Up to 14000 mm Up to 552 ft

**Indicative dimensional program. Maximum width depends on thickness. For wider and thicker plates or other specific request, please consult. Prefabrication pieces according to drawing. Soleil™ B2 can be delivered in shot blasted or pickled condition.*

PLATE PROCESSING

HEAT TREATMENT

The heat treatment consists in a solution annealing 750°C - 800°C (1382 - 1472°F), followed by air cooling.

DECONTAMINATION - PASSIVATION

Nitric bath at 10/20% (in volume). 20°C (68°F).
Water rinsing.

FORMING

Hot forming is typically performed in the 1100 - 700°C (2012 - 1292°F) temperature range followed by air cooling. Limit the holding time at high temperature and finish between 800°C (1472°F) and 700°C (1292°F) in order to refine grains.

COLD FORMING

The cold forming is easy and can be followed by a stress relieving operation at 700 - 800°C (1292 - 1472°F), air cooling.

WELDING

Soleil™ B2 can be welded with the following welding processes : SMAW, GTAW, PAW and GMAW. SAW should not be used without preliminary testing (to check freedom of cracks and toughness of the weld metal). Despite its 100% ferritic microstructure, the martensitic transformation can occur in the low temperature HAZ. Since the carbon content is low, the hardness of this martensite is limited, but it can reduce the elongation properties and toughness of the assembly. It is recommended to weld with low heat input (1.5 kJ/mm as maximal value) in order to limit the growth of the ferrite grains in the high temperature HAZ (detrimental for ductility and toughness properties). For thickness higher than 3 mm, a preheating at 150°C - 250°C can be performed. A low oxygen content in the weld metal is preferable to increase ductility and toughness and to avoid cold cracking. A Post Welding Heat Treatment can be performed between 650 and 750°C and has beneficial effect on mechanical properties. Soleil™ B2 can be welded with homogeneous filler metals such as E 410 / E430 (AWS A5.4) electrodes and ER 410 / ER 430 (AWS A5.9) wires. Austenitic (type 308L or 309L) or austeno-ferritic filler materials can also be used. In those last cases, no post weld heat treatment must be applied.

APPLICATIONS

> Welding set or mechanical pieces in contact with water or steam
> Turbines
> Petrochemicals industries
> Chemical industries
> Nuclear
> Ore transportation

YOUR CONTACTS

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