Valbruna Grade

AISC

Steel type

Austenitic Stainless Steel

Description of material

AISC is a Niobium stabilized austenitic stainless steel with both good general corrosion resistance and very good intergranular corrosion resistance, after welding processes or subjected to a slow cooling rate in service.

Applications

AISC is suitable for the fabrication of many products such as flanges, valves, bolting, pump shafts, food /beverages industry equipment , high temperature chemical processes, rings , storage tanks, many organic chemicals, steam power plant, furnace manifolds, heat temperature devices and parts working in the mild to medium corrosive environments. This grade is chosen in the case of welding processes and in applications where intermittent heating up to 850 C° can happen.

Melting practices

Argon Oxygen Decarburization

Corrosion resistance

AISC is resistant to fresh water, several organic chemicals and inorganic compounds, atmospheric corrosion, rural applications and sterilizing solutions where the chloride level is very low. Pitting and crevice corrosion may occur in chloride environments if concentration, pH and temperature are at determinate levels. As with other standard austenitic grades, AISC suffers from stress corrosion cracking about forty/fifty degrees (C°) above room temperature and with certain levels of stress and halogen concentration. Strain hardened structures increase the risk of stress corrosion cracking. In the case of high temperature service, a stabilizing heat treatment should be carried out to improve the intergranular corrosion resistance. When annealed and fast quenched, AISC offers the best resistance corrosion. It should be noted that this grade, as for every kind of stainless steel, surfaces should be free of contaminant and scale, heat tint, and passivated for optimum resistance to corrosion.

Cold working

AISC is readily fabricated by cold working processes such as cold drawing and bending, but should only be used for a moderate amount of cold heading and cold up setting.

Head office and works:
Viale della Scienza, 25
36100 **VICENZA**
Tel. +39 0444 968211
Fax. +39 0444 963836
www.valbruna-stainless-steel.com

Via Volta, 4
39100 **BOLZANO**
Tel. +39 0471 924111
Fax. +39 0471 924497
www.valbruna-stainless-steel.com

2400 Taylor Street West
46801 **Fort Wayne**, IN - USA
Tel. +1 260 434 2800
Fax. +1 260 434 2801
E-mail: info@valbruna.us
www.valbrunastainless.com

Machinability

Machinists should know that Austenitic grades are different from Ferritic and Alloy steels and require more rigid and powerful machines, in addition to the correct choice of tools, coatings and cutting fluids. The Austenite structure is prone to transform in to α'Martensite caused by strain hardening of the tool on the surface of the machined piece. The knowledge of this behavior must be correctly considered when a piece requires two or several cutting steps to be finished. The layer of α'Martensite is very hard and, if the subsequent turning or milling processes work on this hardened layer, a rapid tool wear could happen. The tool must work under this layer. AISC isn't generally supplied with a micro re - sulphured structure and, therefore, doesn't offer a good chip-ability.

Weldability

AISC has a chemical composition with a controlled balance of Niobium content, whose carbides do not precipitate on the grain boundaries after slow cooling or after welding. No preheating or post welding are normally necessary. However, an annealing after welding should be done if the weld works in very aggressive environments and post welding stabilization in the case of high temperature service. In the case of autogenous welding process, it could be some risk of hot cracking in the fused zone due to a solidification mode from primary ferrite to primary austenite. This could be avoided only if the heat of supplied product has a chemical balance that allows a primary ferrite solidification mode or, alternatively, by a right filler metal and accurate welding procedures involving heat inputs and joint geometry.

Hot working

AISC has a good hot plasticity and is suitable for processing by hot extrusion or by hot upsetting with electric resistance heating. However, overheating must be always avoided. The choice of hot working temperature and process parameters must always evaluate the strain rate and the consequent increasing of temperature that is reached after hot deformation. High strain rates and temperatures at the top end of the range during the extrusion and forging process, could generate internal bursts. Small forgings should be cooled rapidly in air or water quenched. However, the best corrosion resistance is obtained by annealing followed by water quenching.

Designations

AISI	347 / 347H
W.N.	1.4550 / 1.4546
UNS	S34700 / S34709
EN	X6CrNiNb18-10 / X5CrNiNb18-10
BS	347S31 / 347S20

Specifications

ASME	SA182 / SA276 / SA479
ASTM	A182 / A276 / A479
EN	10088-3 / 10222-5 / 10272

Head office and works:
Viale della Scienza, 25
36100 **VICENZA**
Tel. +39 0444 968211
Fax. +39 0444 963836
www.valbruna-stainless-steel.com

Via Volta, 4
39100 **BOLZANO**
Tel. +39 0471 924111
Fax. +39 0471 924497
www.valbruna-stainless-steel.com

2400 Taylor Street West
46801 **Fort Wayne**, IN - USA
Tel. +1 260 434 2800
Fax. +1 260 434 2801
E-mail: info@valbruna.us
www.valbrunastainless.com

Chemical composition

Chemical element	C	Mn	Si	S	P	Ni	Cr	Mo	Nb	Cu	N
Minimum value %	0,04%	-	-	-	-	9%	17%	-	10*C	-	-
Maximum value %	0,08%	2%	0,75%	0,015%	0,04%	12%	19%	0,75%	1%	0,75%	0,1%

Heat treatment

Description of condition	Condition	Minimum temperature °C	Maximum temperature °C	Cooling
Solution Annealed	A	1020	1120	Water / Air

Physical properties

Physical property	SI/metric units	US/BS Imperial units
Density	7,9 kg/dm³	0,285 lb/in³
Specific Thermal Capacity 20° C	500 J/(kg·K)	0,119 Btu/lb°F
Thermal conductivity 20° C	15 W/(m·K)	104,002 Btu in/ ft² h °F
Thermal expansion 20° - 100° C	16,5 (10^{-6}/K)	9,167 (10^{-6}/°F)
Electrical Resistivity 20° C	0,73 Ω·mm²/m	28,74 µΩin
Modulus of Elasticity 20° C	200 GPa	29007,548 ksi

Mechanical properties

Condition	Subtype	Rm [N/mm²]	Rm [Ksi]	Rp0.2% [N/mm²]	Rp0.2% [Ksi]	A5D [%]	HBW
Solution Annealed	A	520 - 740	75 - 107	205 min.	30 min.	40 min.	140 - 223

Hot working

Condition	Minimum temperature °C	Maximum temperature °C	Cooling
Forging / Hot Rolling	850	1150	Air

Head office and works:
Viale della Scienza, 25
36100 **VICENZA**
Tel. +39 0444 968211
Fax. +39 0444 963836
www.valbruna-stainless-steel.com

Via Volta, 4
39100 **BOLZANO**
Tel. +39 0471 924111
Fax. +39 0471 924497
www.valbruna-stainless-steel.com

2400 Taylor Street West
46801 **Fort Wayne**, IN - USA
Tel. +1 260 434 2800
Fax. +1 260 434 2801
E-mail: info@valbruna.us
www.valbrunastainless.com