Sanicro® 32Cu
Billets
Datasheet

Sanicro® 32Cu, commonly known as Alloy 20, is an austenitic nickel-iron-chromium alloy, in the same alloy category as Sanicro 41. It is characterized by:

- Excellent corrosion resistance in environments containing sulphuric acid, chlorides, nitric and phosphoric acid
- Very good resistance in oxidizing environments
- Sufficient resistance to stress corrosion cracking (SCC) in chloride-bearing environments

Standards

- UNS: N08020
- W.Nr.: 2.4660

Product standards

Suitable for the production of flanges etc. according to ASTM A182 and B462

Certificates

Status according to EN 10 204 3.1

Chemical composition (nominal) %

C	Si	Mn	P	S	Cr	Ni	Mo	Other
≤0.025	0.5	1.8	≤0.025	≤0.010	19.5	32.5	2.2	Cu=3.3 Nb>8xC

Applications

Sanicro® 32Cu has excellent resistance in chemical environments containing sulphuric acid, chlorides, nitric and phosphoric acid.

The combination of high strength with good corrosion resistance in acidic environments makes Sanicro® 32Cu a suitable grade for the production of gases, solvents, organic and inorganic chemicals.

Industrial categories	Typical applications
Chemical industry	Flanges
Food industry	Valves and discs

Petrochemical industry	Fittings
Pulp and paper industry	Couplings
Oil & Gas industry	Rings and seals
	Bolts and nuts
	Shafts
	Forgings
	Piping
	Pumps
	Tanks

Corrosion resistance

General corrosion

Sanicro® 32Cu possesses excellent resistance to corrosion. The material is clearly superior to molybdenum-alloyed steels, such as AISI 316L, particularly when exposed to non-oxidizing media, such as sulphuric acid.

Pitting and crevice corrosion

The resistance of Sanicro® 32Cu to pitting and crevice corrosion is superior to that of AISI 316 - a result of the higher chromium and molybdenum contents in the material.

Stress corrosion cracking

The high nickel content of the material promotes excellent resistance to stress corrosion cracking induced by both chlorides and alkalis. The resistance to stress corrosion cracking in sour environment is good.

Intergranular corrosion

Since the material is Nb-stabilized, there is less risk of intergranular corrosion.

Forms of supply

Sizes and tolerances

Round-cornered square, as well as round billets, are produced in a wide range of sizes according to the following tables. Larger sizes offered on request.

Surface conditions

Square billets

Unground, spot ground or fully ground condition.

Round billets

Peel turned or black condition.

Square billets

Size	Tolerance	Length
mm	mm	m
80	+/-2	4 - 6.3
100, 114, 126, 140, 150	+/-3	4 - 6.3
160, 180, 195, 200	+/-4	4 - 6.3
>200 - 350	+/-5	3 - 5.3

Sizes and tolerances apply to the rolled/forged condition.

Peel turned round billets

Size	Tolerance	Length
mm	mm	m
75 - 200 (5 mm interval)	+/-1	max 10
>200 - 450	+/-3	3 - 8

Unground round billets

Size	Tolerance	Length
mm	mm	m
77 - 112 (5 mm interval)	+/-2	max 10
124, 134	+/-2	max 10
127, 147, 157	+/-2	max 10
142, 152, 163	+/-2	max 10
168, 178, 188	+/-2	max 10
183, 193	+/-2	max 10

Other products

- Seamless tube and pipe
- Hollow bar

Heat treatment

Billets are delivered in the hot worked condition. The following heat treatment is recommended for finished products.

Stabilization annealing

930-1010°C (1700-1850°F), followed by quenching in water.

Mechanical properties

Sanicro® 32Cu conforms to the mechanical properties according to specification ASTM B462. Testing is performed on separately solution annealed and quenched test pieces.

At 20°C (68°F)

Metric units

Proof strength	**Tensile strength**	**Elongation**
R	**R**	**A**
p0.2	m	
1)		
MPa	**MPa**	**%**
≥241	≥551	≥30

At 68 °F

Imperial units

Proof strength	**Tensile strength**	**Elongation**
R	**R**	**A**
p0.2	m	
1)		
ksi	**ksi**	**%**

ksi	
%	
≥35	
≥80	
≥30	

1) Corresponds to 0.2 % offset yield strength

At high temperatures

The mechanical properties are stable up to 550°C.

Physical properties

Density: 7.9 g/cm^3

Hot working

The hot forming range for Sanicro® 32Cu is 900-1175°C (1740-2150°F), followed by quenching in water. Subsequent heat treatment should be carried out in accordance with the recommendations given for heat treatment.

Welding

The weldability of Sanicro® 32CU is good. Suitable methods of fusion welding are manual metal-arc welding (MMA/SMAW) and gas-shielded arc welding, with the TIG/GTAW method as first choice. Preheating and post-weld heat treatment are not necessary.

The welding of fully austenitic steels often entails the risk of hot cracking, particularly if the weldment is under constraint. To reduce the cracking risk, the welding should be carried out with a low heat input.

For Sanicro® 32CU, heat input of <1.0 kJ/mm and interpass temperature of <100°C (210°F) are recommended. A string bead welding technique should be used.

Recommended filler metals

TIG/GTAW or MIG/GMAW welding

ISO 14343 S 27 31 4 Cu L/AWS A5.9 ER383 (e.g. Exaton 27.31.4.LCu)

MMA/SMAW welding

ISO 3581 E 27 31 4 Cu L R/AWS A5.4 E383-16 (e.g. Exaton 27.31.4.LCuR)

Machining

Machining Sanicro® 32Cu, as with other stainless steels, requires an adjustment to tooling data and machining method, in order to achieve satisfactory results. Compared to Sanmac® 316/316L, the cutting speed must be reduced by approximately 50-55%, when turning Sanicro® 32Cu with coated, cemented carbide tools. Much the same applies to other operations. Feeds should only be reduced slightly and with care.

Detailed recommendations for the choice of tools and cutting data are provided in the data sheet for Sanmac® 316/316L.

Recommendations are for guidance only, and the suitability of a material for a specific application can be confirmed only when we know the actual service conditions. Continuous development may necessitate changes in technical data without notice. This datasheet is only valid for Alleima materials.

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