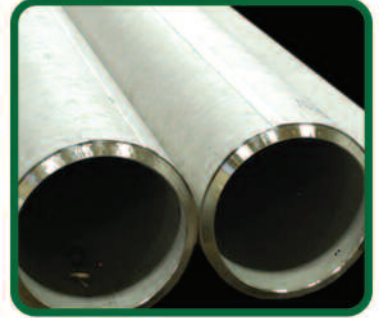
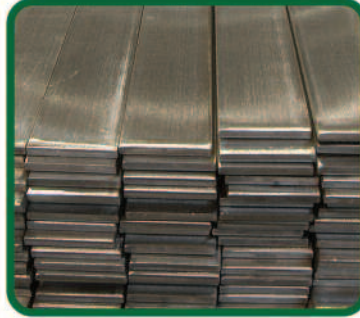
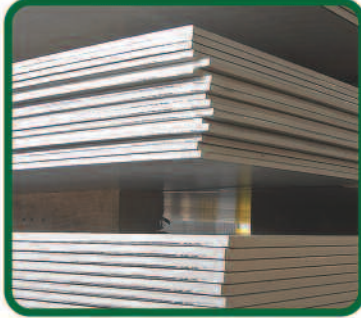
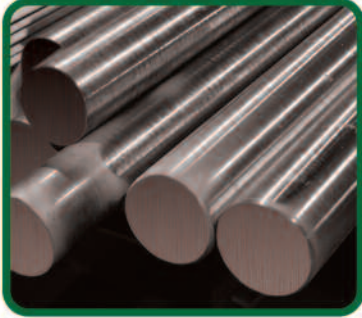




ALLOY 20 SPECIFICATIONS: UNS N08020



ALLOY 20 (UNS N08020)

Penn Stainless inventory now includes Alloy 20 (UNS N08020) in sheet, sheet coil, plate, round bar, processed flat bar and tubular products.

GENERAL PROPERTIES

Alloy 20 (UNS N08020) is an austenitic, nickel-iron-chromium based superalloy with additions of Copper and Molybdenum which provide resistance to hostile environments, pitting, and crevice corrosion. It is also stabilized with Columbium to minimize carbide precipitation during welding. Alloy 20 appears to fall between both the stainless and nickel categories as it contains characteristics of both. It was designed for maximum resistance to acid attack and demonstrates superior resistance to stress-corrosion cracking in boiling 20% to 40% sulfuric acid, and also has excellent general corrosion resistance to sulfuric acid and to chloride stress corrosion cracking. Alloy 20 has good mechanical properties at both ambient and elevated temperatures, up to approximately 930°F (500°C) and is readily fabricated by usual industrial processes.

APPLICATIONS

Alloy 20 was originally designed for use in sulfuric acid related applications; however, it is now frequently used in a wide variety of industries. Applications that commonly use Alloy 20 include:

- Chemical and allied industries
- Heat exchangers
- Tanks
- Pickling racks
- Pharmaceuticals
- Food and dye production
- Explosives
- Valves
- Manufacture of synthetic rubber and plastics
- SO₂ scrubbers and other severe environments

STANDARDS ALLOY 20

ASTM/ASMEUNS N08020
 EURONORMFeNi35Cr20Cu4Mo2
 DIN2.4660

ALLOY 20 (UNS N08020) CAN BE PROCESSED BY PENN STAINLESS UTILIZING THE FOLLOWING METHODS:

- SHEAR CUTTING
- PLASMA CUTTING
- HQ PLASMA CUTTING
- DYNAMIC WATER JET CUTTING
- LASER CUTTING
- SAW CUTTING
- GAUER PROCESSING
- MACHINE CUTTING



PRODUCT OFFERING:

- SHEET
- PLATE
- ROUND BAR
- S/E PROCESSED BAR
- TUBULAR PRODUCTS

CORROSION RESISTANCE

- Excellent resistance to general corrosion, pitting, and crevice corrosion in chemicals containing chlorides and sulfuric, phosphoric, and nitric acids.
- Nickel content aids in chloride ion stress and corrosion resistance.
- Additions of Copper and Molybdenum provide resistance to hostile environments, pitting, and crevice corrosion.
- Chromium adds to its resistance of oxidizing environments such as nitric acids.
- Columbium reduces the effects of carbide precipitation.

WELDABILITY

- All commonly used welding methods, with the exception of oxyacetylene, can be successfully used.
- The presence of Columbium tends to minimize the precipitation of carbides in the heat-affected zone, so the material may be used in the as-welded condition in most cases.
- Pre-heating is not required.

HEAT TREATMENT

- Cannot be hardened by heat treatment.
- Stabilized-annealing is done at 1750-1850°F, followed by water quenching.
- Stress relieving can be performed on annealed material up to 950° F.

PROCESSING / HOT FORMING

- Heat uniformly to a starting temperature of 2100-2225°F. Finish forging before the stock drops below 1800°F.
- In order to stabilize the material after hot working operations, reheat at 1750-1850°F for a minimum of ½-hour per one inch of thickness and water quench.

PROCESSING / COLD FORMING

- Alloy 20 has good cold formability. Bending, drawing and pressing, and other forming operations that occur in the production of fabricated items are readily performed.
- Alloy 20 can normally be press brake bent over a radius twice the materials thickness.
- After cold reductions of more than 15%, a final stabilizing annealing is often required.

MACHINABILITY

- Because of Alloy 20's high work-hardening rate the following are required:
 - Only low surface-cutting speeds are possible compared with low-alloy standard austenitic stainless steel.
 - Tools should be engaged at all times.
 - Heavy feeds are important in getting below the work-hardened 'skin'.

CHEMICAL PROPERTIES

Type	C	Cr	Cu	Fe	Mn	Mo	Ni	P	Si	S	Nb (Cb)
Alloy 20 UNS N08020	0.07 max	min: 19.00 max: 21.00	min: 3.00 max: 4.00	Balance	2.00 max	min: 2.00 max: 3.00	min: 32.00 max: 38.00	0.045 max	1.00 max	0.035 max	8 XC min 1.00 max

MECHANICAL PROPERTIES

Stabilized-Annealed Condition						
Product Form	Tensile Strength ksi (min)	Yield Strength 0.2% offset ksi (min)	Elongation % (min)	Reduction of area % (min)	Hardness Brinell (max)	Hardness Rockwell B (max)
Plate, Sheet	80	35	30	–	217	95
Bar, Shapes	80	35	30	50	–	–

PHYSICAL PROPERTIES

Density	Specific Gravity	Specific Heat at 32 to 212°F	Electrical Resistivity at 68°F	Poisson's Ratio	Magnetic Permeability at 68°F	Modulus of Elasticity at 68°F
0.292 lbs/in ³	8.08	0.12 BTU/lb/°F	644 ohm-cir mil/ft	0.31	1.002 Mu	29.3 x 10 ⁶ psi

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