



# STAINLESS

High performance Alloys - Medical - Aerospace - Microtechnics - Motorsport - Industry

1.4021  
AISI 420A  
X20Cr13

## GENERALITIES

**Grade 1.4021** is a martensitic stainless steel that can reach a hardness of about 46 HRC after hardening and tempering and has high abrasion resistance with moderate corrosion resistance. Its production is usually carried out in air (EAF+AOD).

Stainless has various formats in stock to best meet your processing requirements. This product can also be made to measure or cut into blanks by our service centers.

## APPLICATIONS

Due to its corrosion resistance and hardness in the treated state (46HRC), the grade is used especially in the manufacture of instruments for medicine, in the food industry or even in the field of cutlery.

## STANDARDS AND DESIGNATIONS

### Numerical designations:

W. Nr 1.4021 – AISI 420A – UNS S42000

### Standards :

NF S 94-090 - ASTM F 899 – NF EN 10088 -3 / -2 – ISO 7153-1 – ASTM A276

### Brands:

UGI4021@...

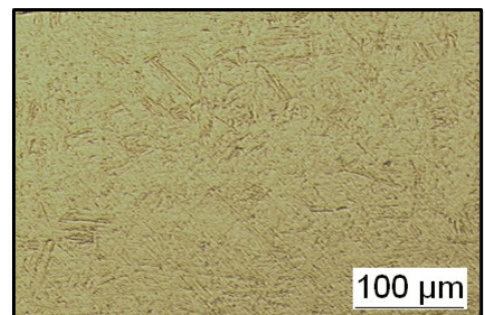
X20Cr13 (oldly Z20C13)

## TYPICAL CHEMICAL ANALYSIS (mass %)

	Carbon	Manganese	Phosphorus	sulfur	silicium	Chrome	Nickel	Cobalt	Iron
MIN	0.16	---	---	---	---	12.0	---	---	BALANCE
MAX	0.25	1.0	0.040	0.030	1.0	14.0	1.0	0.10	

## METALLURGY

The elaboration processes associated with the transformation processes allow to obtain a homogeneous microstructure with a homogeneous distribution of carbides. In the processed state, the microstructure consists of martensite and partially dissolved carbides (see photo below):



**PHYSICAL PROPERTIES AT 20°C**

**Density**.....7,7 g.cm-3.  
**Coefficient of thermal expansion (between 20 et 200°C)**.....10,5 x 10<sup>-6</sup> m/m.°C  
**Young's modulus**.....216 x 10<sup>3</sup> MPa  
**Thermal conductivity**.....30 W.m .K<sup>-1</sup>  
**Ferromagnetic grade that can be magnetized**

**MECHANICAL PROPERTIES OF THE BARS**

The grade is offered in the annealed condition (condition A) or in the pretreated condition QT 700 or QT800 with the following properties:

Delivery status	Mechanical properties
Annealing	< 240 HBW
QT 700	Rm 700-850 MPa
QT 800	Rm 800-950 MPa

The microstructure in the annealed state consists of ferrite and carbides. In the QT states, the microstructure consists of martensite and carbides.

**PROCESSIES**

**Forgeability**

The grade can be hot forged in the temperature range of 1000/1100°C.

**Machinability/Polishability**

Machinability of this grade does not present difficulties in the QT700 or QT800 condition. The grade is polishable in the treated condition with a structure consisting of martensite and carbides. The laser marking may introduce a local decrease in corrosion resistance, especially in case of overheating.

**Typical heat treatments**

For a target hardness ≥ 45HRC

- Heating 950/1050°C
- Oil or gas quenching under pressure
- Tempering from 180°C /2h - It is not recommended to temper between 400 and 600°C (embrittlement zone)

**CORROSION RESISTANCE**

The grade contains little chromium and no molybdenum, which limits its corrosion resistance. Corrosion resistance is all the better when the surfaces are polished, pickled and passivated. The corrosion resistance is strongly degraded in the annealed condition or after welding, which is not recommended.

**STANDARD SHAPE**

- Round bars in annealed condition (Condition A) or pre-treated QT 700 or QT 800 - Surface hardened or ground according to the diameters
- Flat bars made to measure in the annealed condition (consult us) - Forged blocks - Sheets
- Other formats : please contact us

The information, data and photos presented in this document are given in good faith and for information purposes only. If you need more precise data, our technical department is at your disposal. Click on the link : [t.turpin@stainless.eu](mailto:t.turpin@stainless.eu)