



# STAINLESS GROUP

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

Custom®465

1.4614  
ASTM F899  
ASTM A564  
AMS 5936

## GENERALITIES

Alloy 1.4614 or Custom®465 is a structurally hardened martensitic stainless steel that combines a high hardness of 50 HRC with good corrosion resistance. This grade has a hardening peak at 480°C which allows easy ageing after machining on an initially solution treated condition (condition A). The grade is vacuum melted and remelted (VIM+VAR) to aircraft quality. A hardened version after quenching is also available in order to reach nearly 54HRC on small diameters.

Stainless has a range of sizes in stock to suit your application needs. This product can also be made to measure or cut into pieces by our service centres.

## APPLICATIONS

Due to its good corrosion resistance, good hardness in the treated state (50HRC) and its resilience, the grade is used in the manufacture of instruments for the medical, automotive, energy and aeronautical sectors.

## STANDARDS AND DESIGNATIONS

### Numerical designations:

W. Nr 1.4614 - UNS S46500

### Standards:

ASTM F 899 - ASTM A564 - AMS 5936

### Brands:

Custom®465, Chronifer®465KL...

## TYPICAL CHEMICAL ANALYSIS (mass %)

	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Chromium	Nickel	Titanium	Molybdenum	Cobalt	Iron
min	---	---	---	---	---	11.0	10.75	1.50	0.75	---	BALANCE
max	0.02	0.25	0.015	0.010	0.25	12.50	11.25	1.80	1.25	0.10	

## METALLURGY

The melting processes combined with the transformation processes result in a homogeneous microstructure. In the processed state, the microstructure consists of martensite and nano-sized intermetallic precipitates which germinate during ageing.



## PHYSICAL PROPERTIES AT 20°C

Density.....	7.83 g.cm <sup>-3</sup>
Coefficient of thermal expansion (between 20 et 200°C).....	10.6 x 10 <sup>-6</sup> m/m.°C
Young's modulus.....	197 x 10 <sup>3</sup> MPa
Thermal conductivity.....	16 W.m <sup>-1</sup> K <sup>-1</sup>

**Ferromagnetic grade that can be magnetised**

## MECHANICAL PROPERTIES OF THE BARS

In particular, the grade is offered in the hardened or annealed condition (cond A) with the following properties:

Delivery temper	Hardness
Soaked or Annealed (cond A)	< 330 HBW

## PROCESSIES

### Forgeability

The grade can be hot forged in the temperature range 1010/1090°C. Resolving will be necessary to achieve maximum age hardness.

### Weldability

The grade can be welded (MIG, TIG) on an annealed condition but hardness heterogeneities may occur in the heat affected zone. If necessary, a full anneal should be carried out after welding.

### Typical heat treatments on an annealed initial condition:

For a target hardness ≥ 50HRC (1700MPa)	For a hardness/resilience compromise with Rm>1650MPa (> 47HRC )
<b>Aging H900 (480°C /4h)</b>	<b>Aging H950 (510°C /4h)</b>

A volume contraction of up to about 0.07% can be expected during ageing

## CORROSION RESISTANCE

The grade behaves almost like a type 304 steel and has good corrosion resistance. Passivation is recommended to optimise its corrosion resistance. The microstructure contains little or no chromium carbides, which makes it highly insensitive to intergranular corrosion.

## STANDARD SHAPE

- Round bars, annealed condition - Hardened or ground surface depending on the diameter
- Other format: small diameter hardened bars: consult 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)