

## SPECIFICATIONS

European standards:

- X1CrNiMoAlTi12-10-2
- Numerical designation: 1.4596

UNS : S10120

AMS : 5935

## COMPOSITION

Carbon.....	< 0.02
Chromium.....	12.00
Nickel.....	10.00
Molybdenum.....	2.00
Aluminum.....	0.90
Titanium.....	0.30

## TYPICAL MECHANICAL PROPERTIES

- Solution treatment: heat to 840°C followed by air, oil or water cooling:
  - Brinell Hardness: 293

### HEAT TREATMENT REFERENCE

- For UTS > 1400 N/mm<sup>2</sup>: aging 540°C / 4 hrs:
  - UTS: 1440 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 1370 N/mm<sup>2</sup>
  - Elongation (5d): 10.5 %
  - Impact strength KV: 60 J
- For UTS > 1520 N/mm<sup>2</sup>: aging 510°C / 4 hrs:
  - UTS: 1570 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 1490 N/mm<sup>2</sup>
  - Elongation (5d): 10 %
  - Impact strength KV: 35 J

## APPLICATIONS

- Very heavily stressed parts requiring good corrosion resistance and very good mechanical properties.
- Aerospace industry.

## CHARACTERISTICS

- Precipitation hardened stainless steel of very high purity, vacuum melted and consumable electrode remelted.
- Excellent mechanical properties in the longitudinal and transverse directions.
- Excellent balance between strength, toughness and fatigue properties, especially at the 1400 N/mm<sup>2</sup> strength level (>PH13-8Mo).
- Good resistance to corrosion and stress corrosion.
- Good weldability.

## HEAT TREATMENT

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- This steel may be supplied either in the solution treated condition or in the solution treated and aged condition (the latter being the in-service condition).
- Aging:  
This steel must undergo a precipitation hardening treatment in order to attain its optimum characteristics. The temperature for this treatment is situated between 480 and 550°C depending on the level of mechanical properties required.

## PHYSICAL PROPERTIES

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- Density: 7.8
- Mean coefficient of expansion in m/m.°C:
  - between 20°C and 100°C:  $10.0 \times 10^{-6}$
  - between 20°C and 300°C:  $10.7 \times 10^{-6}$
  - between 20°C and 500°C:  $11.8 \times 10^{-6}$
- Modulus of elasticity in N/mm<sup>2</sup>:
  - at 20°C:  $195 \times 10^3$

## FORGING

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- 1200/800°C

## WELDING

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Welding is usually carried out in the solution treated condition. The aging treatment, carried out after welding, allows both the parent metal and weld bead to be hardened.

Contact:

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