

## SPECIFICATIONS

X1CrNiMoAlTi 12-10-2

UNS : S11902

AMS : 5955

## COMPOSITION

Carbon .....	≤ 0.02
Chromium.....	12.25
Nickel.....	10.00
Molybdenum.....	2.00
Aluminum.....	1.45
Titane.....	1.15

## TYPICAL MECHANICAL PROPERTIES

- After aging at 520°C / 16hrs:
  - UTS: 1850 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 1740 N/mm<sup>2</sup>
  - Elongation (5d): 11 %
  - Toughness K1c: 60 MPa√m

### HEAT TREATMENT REFERENCE

- After aging at 510°C / 16hrs:
  - UTS: 1890 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 1770 N/mm<sup>2</sup>
  - Elongation (5d): 10 %
  - Toughness K1c: 55 MPa√m
- After aging at 490°C / 16hrs:
  - UTS: 1930 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 1800 N/mm<sup>2</sup>
  - Elongation (5d): 9 %
  - Toughness K1c: 45 MPa√m

## APPLICATIONS

- Forgings and mechanical parts in stainless steel requiring very good mechanical properties.
- Structural parts for the aerospace industry.
- Missile components.
- Fasteners.
- High pressure pumps and valves.
- Offshore industry.

## CHARACTERISTICS

- Precipitation hardened stainless steel of very high purity, vacuum primary melted and consumable electrode remelted.
- Excellent mechanical properties in the longitudinal and transverse directions.
- Excellent balance between strength and toughness properties, and excellent fatigue resistance.
- Good resistance to corrosion and stress corrosion.
- Very good weldability. Welding should preferably be carried out in the solution treated condition.  
Aging carried out after welding allows both the parent metal and weld bead to be hardened.

## HEAT TREATMENT

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- Delivered condition:  
The steel is supplied in the solution treated condition.
- Aging:  
This steel must undergo a hardening treatment in order to attain its final properties for service.  
The most interesting temperature for this treatment is situated between 480°C and 540°C depending on the level of mechanical properties required.

## PHYSICAL PROPERTIES

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- Density: 7.8
- Mean coefficient of expansion in  $m/m.^{\circ}C$ :
  - between 20°C and 100°C:  $10.8 \times 10^{-6}$
  - between 20°C and 300°C:  $11.6 \times 10^{-6}$
  - between 20°C and 500°C:  $12.1 \times 10^{-6}$
- Modulus of elasticity in  $N/mm^2$ :
  - at 20°C:  $195 \times 10^3$

Contact:

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The data provided in this document represent typical or average values rather than maximum or minimum guaranteed values. The applications indicated for the grades described are given as guidance only in order to help the reader in his personal assessment. Please note that these do not constitute a guarantee whether implicit or explicit as to whether the grade selected is suited to specific requirements. Aubert & Duval's liability shall not under any circumstances extend to product selection or to the consequences of that selection.