AUBERT&DUVAL

Steel

MARVAL®X12H

X1CrNiMoAlTi12-10-2

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^2: aging 540°C / 4 hrs:
  - UTS: 1440 N/mm^2
  - 0.2 % Yield strength: 1370 N/mm^2
  - Elongation (5d): 10.5 %
  - Impact strength KV: 60 J
- For UTS > 1520 N/mm^2: aging 510°C / 4 hrs:
  - UTS: 1570 N/mm^2
  - 0.2 % Yield strength: 1490 N/mm^2
  - 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^2 strength level (>PH13-8Mo).
- Good resistance to corrosion and stress corrosion.
- Good weldability.

HEAT TREATMENT

- 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

- Density: 7.8

- Mean coefficient of expansion in m/m.°C:
  - between 20°C and 100°C: 10.0×10^{-6}
  - between 20°C and 300°C: 10.7×10^{-6}
  - between 20°C and 500°C: 11.8×10^{-6}

- Modulus of elasticity in N/mm^2:
  - at 20°C: 195×10^3

FORGING

- 1200/800°C

WELDING

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:

www.aubertduval.com