

## SPECIFICATIONS

X2NiCoMo18-9-5

WL : 1.6358

UNS : K93120

## COMPOSITION

Carbon.....	≤ 0.010
Nickel.....	18.00
Cobalt.....	8.75
Molybdenum.....	4.90
Titanium.....	0.70
Aluminum.....	0.10

## TYPICAL MECHANICAL PROPERTIES

- Solution treatment: Heat to 820°C followed by air cool:
  - UTS: 1070 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 870 N/mm<sup>2</sup>
  - Elongation (5d): 14 %
  - Reduction of area: 70 %
  - Vickers hardness HV: <360
  - Rockwell hardness HRC <36
- After ageing at 480°C for 4 hours, mechanical properties at 20°C are as follows:
  - UTS: 2050 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 1980 N/mm<sup>2</sup>
  - Elongation (5d): 8,5 %
  - Reduction of area: 53 %
  - Toughness K1c: 65 MPa√m
  - Impact strength KV: 25 J
  - Vickers hardness HV: 590
  - Rockwell hardness HRC: 53

## APPLICATIONS

- Structural parts.
- Rocket motor bodies for missiles.
- Centrifuge components.

## CHARACTERISTICS

- Very low carbon maraging steel containing Ni, Co, Mo and Ti, vacuum melted and consumable electrode remelted.
- High proof stress and good toughness.
- Excellent weldability.

## HEAT TREATMENT

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- Starting from the solution treated condition, hardening is achieved using the following ageing treatment:
  - Heat to 480°C.
  - Hold at temperature for 3 to 5 hours.

A very slight contraction of the part (of the order of 0.07 %) occurs during the ageing treatment.

## PHYSICAL PROPERTIES

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- Mean coefficient of expansion in  $m/m.^{\circ}C$ :
  - Solution treated condition:
    - between -196°C and 20°C:  $8.6 \times 10^{-6}$
    - between 0°C and 100°C:  $9.9 \times 10^{-6}$
    - between 0°C and 200°C:  $10.2 \times 10^{-6}$
    - between 0°C and 300°C:  $10.5 \times 10^{-6}$
    - between 0°C and 400°C:  $10.8 \times 10^{-6}$
  - Aged condition:
    - between -196°C and 20°C:  $8.3 \times 10^{-6}$
    - between 0°C and 100°C:  $9.5 \times 10^{-6}$
    - between 0°C and 200°C:  $10.2 \times 10^{-6}$
    - between 0°C and 300°C:  $10.6 \times 10^{-6}$
    - between 0°C and 400°C:  $11.0 \times 10^{-6}$
- Modulus of elasticity in  $N/mm^2$ :
  - tensile at 20°C:  $195 \times 10^3$
  - torsional at 20°C:  $72 \times 10^3$
- Thermal conductivity in  $W.m/m^2.^{\circ}C$ :
  - at 20°C: 20.5
  - at 100°C: 21.8
- Electrical resistivity in  $\mu\Omega.cm^2/cm$ :
  - at 20°C: (softened condition): 65
  - at 20°C: (aged condition): 45

## FORGING

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- 1280/830°C

## WELDING

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- MY19 is highly suitable for TIG or MIG welding. Assembly is carried out in the softened or the aged condition. The weld bead can be hardened by the same ageing treatment as the parent metal without solution treatment of the welded assembly.

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.