AUBERT&DUVAL

Nickel-based Alloy

PER3

NiCr20Co13Mo4Ti3Al

SPECIFICATIONS

European standards:

- NiCr20Co13Mo4Ti3Al
- Numerical designation: 2.4654

AIR : NC 20 K 14
WL : 2.4654
UNS : N07001
AMS : 5706 - 5708 - 5709

COMPOSITION

Carbon	< 0.06
Chromium	19.00
Colbalt	13.50
Molybdenum	4.00
TItanium	3.00
Aluminum	1.90
Nickel	Base

TYPICAL MECHANICAL PROPERTIES

On metal supplied ready for use:

- Tensile test at ambient temperature:
  - UTS: 1270 N/mm^2
  - 0.2 % Yield strength: 850 N/mm^2
  - Elongation (5d): 25 %
- Tensile test at 600°C:
  - UTS: 1150 N/mm^2
  - 0.2 % Yield strength: 710 N/mm^2
  - Elongation (5d): 30 %
- Tensile test at 800°C:
  - UTS: 690 N/mm^2
  - 0.2 % Yield strength: 640 N/mm^2
  - Elongation (5d): 29 %
- Tensile test at 1000°C:
  - UTS: 200 N/mm^2
  - 0.2 % Yield strength: 140 N/mm^2
  - Elongation (5d): 25 %
- Creep:

Temperature in °C	Average load in N/mm² causing creep fracture in 1000 hrs
600	730
700	430
750	305
800	190
850	105

APPLICATIONS

- Aerospace industry: turbine blades and discs, fasteners for high temperature environments.
- Marine and land-based machines: gas turbine blades.

CHARACTERISTICS

Precipitation hardened, nickel-based superalloy with:

- Excellent corrosion resistance.
- Very good mechanical properties up to 950°C.

HEAT TREATMENT

- Solution treatment & precipitation heat treatment:
  1020°C / 4 hrs / Air cool + 850°C / 4 hrs / Air cool + 760°C / 16 hrs / Air cool.

PHYSICAL PROPERTIES

- Density:
  - at 20°C: 8.20
  - at 400°C: 8.10
  - at 800°C: 7.95

- Mean coefficient of expansion in m/m.°C:
  - between 20°C and 200°C: 12.6×10^{-6}
  - between 20°C and 400°C: 13.3×10^{-6}
  - between 20°C and 600°C: 14.2×10^{-6}
  - between 20°C and 800°C: 15.7×10^{-6}

- Modulus of elasticity in N/mm^2:
  - at 20°C: 209×10^3
  - at 200°C: 202×10^3
  - at 400°C: 191×10^3
  - at 600°C: 179×10^3
  - at 800°C: 163×10^3

- Thermal conductivity in $W.m/m^2.°C$:
  - at 20°C: 10.5
  - at 200°C: 12.7
  - at 400°C: 15.7
  - at 600°C: 19.0
  - at 800°C: 22.5
  - at 1000°C: 27.0

- Specific heat in J/g.°C:
  - at 20°C: 0.51
  - at 200°C: 0.55
  - at 400°C: 0.59
  - at 600°C: 0.63
  - at 800°C: 0.67
  - at 1000°C: 0.72

FORGING

- 1200/800°C

Contact:

www.aubertduval.com