AUBERT&DUVAL

Nickel-based Alloy

PYRAD49D

NiCr21Fe18Mo9

SPECIFICATIONS

European standards:

- NiCr21Fe18Mo9

AIR :	NC 22 FeD
WL :	2.4665
UNS :	N06002
BS :	HR6, HR 204

COMPOSITION

Carbon	0.09
Chromium	22.00
Iron	18.50
Molybdenum	9.00
Cobalt	1.50
Manganese	≤ 1.00
Silicon	≤ 1.00
Nickel	Base

TYPICAL MECHANICAL PROPERTIES

On metal supplied ready for use:

- Tensile test at ambient temperature:
  - UTS: 790 N/mm^2
  - 0.2 % Yield strength: 390 N/mm^2
  - Elongation (5d): 54 %

- Rapid tensile test at temperature:

Temperature in °C	UTS in (N/mm^2)	0.2 % Yield strength in (N/mm^2)	Elongation (5d) in %
200	730	340	-
400	700	310	-
500	650	300	42
600	600	290	39
700	530	270	38
800	400	250	41

- Creep:

Temperature in °C	Average load in N/mm^2 causing creep fracture in 1000 hrs
650	230
700	190
800	70
900	35

APPLICATIONS

- Sheet fabrications for jet engines.
- Guide vanes for jet engines.
- Injection nozzles and cones.
- Hot gas manifolds.
- Combustion chamber components.
- Sheet fabrications and hearths for furnaces operating continuously at 1100°C.

CHARACTERISTICS

Precipitation hardened, nickel-based superalloy with:

- Very good resistance to oxidation.
- Very good mechanical properties at high temperatures.

HEAT TREATMENT

- Solution treatment:
  1100-1180°C / 30 min / Air cool

PHYSICAL PROPERTIES

- Density:
  - at 20°C: 8.2
  - at 400°C: 8.1
  - at 600°C: 7.9

- Mean coefficient of expansion in m/m.°C:
  - between 20°C and 200°C: 14.2 x 10^{-6}
  - between 20°C and 400°C: 14.7 x 10^{-6}
  - between 20°C and 600°C: 15.3 x 10^{-6}
  - between 20°C and 800°C: 16.0 x 10^{-6}

- Modulus of elasticity in N/mm^2:
  - at 20°C: 165 x 10^3
  - at 200°C: 164 x 10^3
  - at 400°C: 149 x 10^3
  - at 600°C: 152 x 10^3
  - at 800°C: 142 x 10^3

- Thermal conductivity in W.m/m^2.°C:
  - at 20°C: 9
  - at 200°C: 13
  - at 400°C: 16
  - at 600°C: 20
  - at 800°C: 24
  - at 1000°C: 28

- Specific heat in J/g.°C:
  - at 20°C: 0.48
  - at 200°C: 0.49
  - at 400°C: 0.53
  - at 600°C: 0.61
  - at 800°C: 0.69
  - at 1000°C: 0.77

FORGING

- 1180/1050°C

Contact:

www.aubertduval.com