



Variants:

GKHW: Consumable electrode remelted grade

GKHYW: Vacuum induction melted and consumable electrode remelted grade

## SPECIFICATIONS

AECMA :

- Designation: FE-PL1504
- 33CrMoV12

AIR : 32 CDV 13

UNS : K24340

For the vacuum melted and remelted grade:

UNS : K24340

## MECHANICAL PROPERTIES

- Annealed condition: heat to 850 °C followed by slow cooling.
  - Brinell hardness: 210
- Oil quench from 900/925 °C. Temper at 600 °C.
  - UTS: 1300 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 1100 N/mm<sup>2</sup>
  - Elongation (5d): 15 %
  - Impact strength KCU: 70 J/cm<sup>2</sup>
- Oil quench from 900/925 °C. Temper at 660 °C.
  - UTS: 1000 N/mm<sup>2</sup>
  - 0.2 % Yield strength: 850 N/mm<sup>2</sup>
  - Elongation (5d): 20 %
  - Impact strength KCU: 170 J/cm<sup>2</sup>

## COMPOSITION

Carbon .....	0.30
Chromium .....	3.00
Molybdenum.....	1.00
Vanadium .....	0.20

## APPLICATIONS

- GKH is used to produce nitrided parts which need to be extremely stable after hardening and tempering. It is particularly suitable for producing parts that undergo special nitriding.
- Gears, spindles, machine-tool fittings, crankshafts, precision parts, aircraft parts.
- Thrust rings, bearing races working up to 400 °C.

## CHARACTERISTICS

- Nitriding steel with an excellent level of hardenability and particularly high mechanical properties, impact strength and fatigue limit (GKHW and GKHYW grades).
- It may be nitrided in the heat treated condition to obtain a strength from 900 N/mm<sup>2</sup> to 1350 N/mm<sup>2</sup>. The nitrided layer is ductile.

## HEAT TREATMENT

- Harden:
  - Heat to 900/925 °C.
  - Oil quench.
- Temper:
  - Above 525 °C
  - depending on properties required.
- Nitriding:
  - Surface hardness: approx. 850 Vickers.

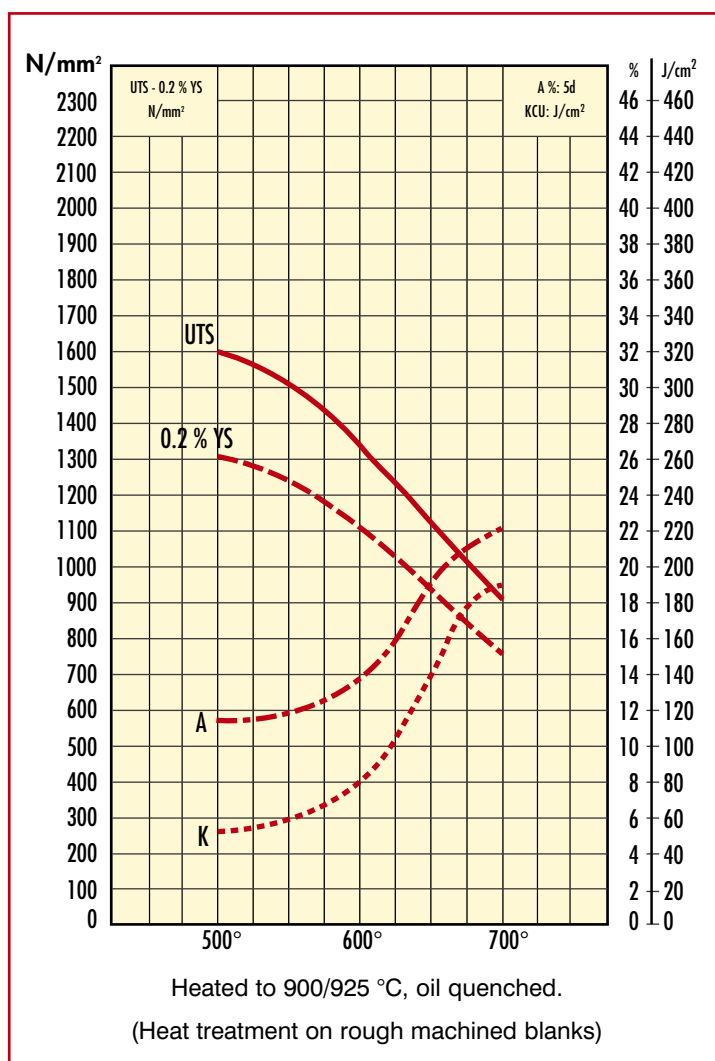
## PHYSICAL PROPERTIES

- Density: 7.8
- Mean coefficient of expansion in m/m.°C:
  - between 20 °C and 100 °C:  $11.8 \times 10^{-6}$
  - between 20 °C and 500 °C:  $13.6 \times 10^{-6}$
- Critical points:
  - Ac 1: 800 °C
  - Ac 3: 845 °C

## FORGING

- 1150/1000 °C

## TEMPERING CURVE



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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.