

DATA SHEET ON A NEW Cr-W-V TOOL STEEL

This Tool Steel was Developed at the All-Union Tool
Research Institute; Inventors: A. P. Gulyaev and
A. A. Badaeva. USSR Patent 113,393.

TTT diagram, data on Properties, Hardenability and Heat Treatment of a Soviet-developed Tool Steel Kh6WF (1-1.5% C, >0.45% Mn, 0.35% Si, 5.5-7 Cr, 1.1-1.5 W, 0.5-0.7 V, 0.35 Ni, 0.03 P, 0.03 S)

This tool steel is intended for making dies for cold working of metals; for light duty cutting tools and for other articles in which high hardness, wear resistance, small distortion in quenching and full hardenability are required. Dies, knurling rollers and threading dies, woodworking tools, razors and other tools and articles are made from the steel.

This steel, used for the same purposes as steels of the Kh12 (nominal 12% chromium) type differs from them by a lesser degree of carbide segregation and better mechanical properties, but a somewhat lower wear resistance. This is due to the smaller amount of carbide in steel Kh6VF.

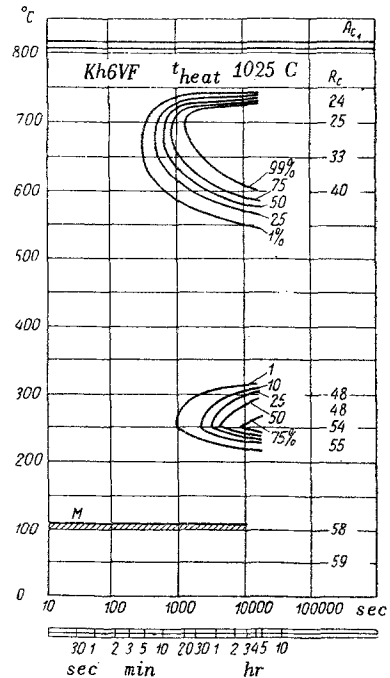
Composition of Steel Kh6VF

| | | | | |
|--------|-------|---------|---------|------|
| C | Cr | W | V | |
| 1-1.5 | 5.5-7 | 1.1-1.5 | 0.5-0.7 | |
| Mn | Si | S | P | Ni |
| > 0.45 | 0.35 | 0.03 | 0.03 | 0.35 |

Phase Composition of As-Annealed Steel.

| | | | |
|--|-----|------|---------|
| Ferrite 86.1% | | | |
| C | Cr | W | Fe |
| 0 | 0.2 | 0.02 | Balance |
| Carbide Cr ₇ C ₃ : 13.9% | | | |
| C | Cr | W | Fe |
| 9.1 | 43 | 2.9 | 46 |

TTT diagram for Austenitizing Temperature of 1025°C (1875°F)

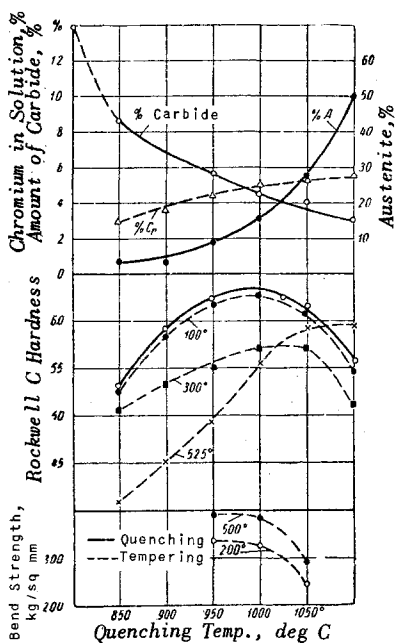


As annealed hardness: 228 Brinell units (optimum diameter 4 mm = 0.16 in).

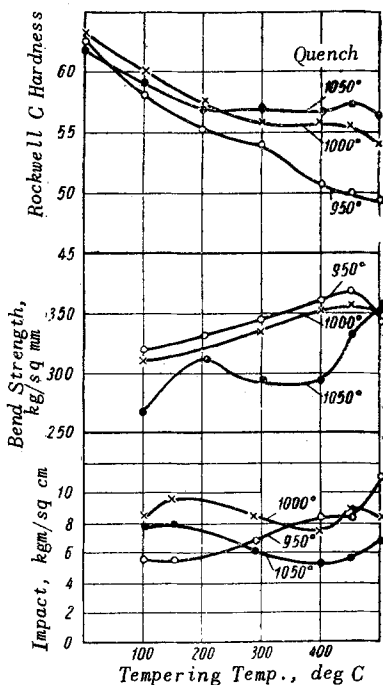
Ac₁ point 800-820°C (1470-1510°F)

PROPERTIES

Effect of Hardening Temperature

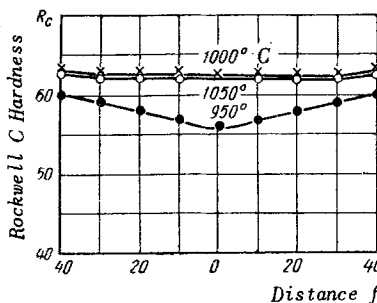


Effect of Tempering Temperature



HARDENABILITY

Oil Quenching



Air Cooling

