



Material No.: Code:  
**1.8159 51CrV4**

DE - Brand:  
**NCV**

**Chemical composition:**  
(Typical analysis in %)

C	Cr	V					
0,51	1,10	0,20					

**Steel properties:**

CrV-alloyed steel, usually supplied in quenched and tempered condition.

**Applications:**

Parts for general mechanical engineering, automotive and gear parts.

**Condition of delivery:**

- a) annealed, max. 248 HB
- b) quenched and tempered

**Physical properties:**

Thermal expansion coefficient	$\left[ \frac{10^{-6} \cdot \text{m}}{\text{m} \cdot \text{K}} \right]$	$\frac{20-100^{\circ}\text{C}}{12,2}$	$\frac{20-200^{\circ}\text{C}}{12,8}$	$\frac{20-300^{\circ}\text{C}}{13,3}$	$\frac{20-400^{\circ}\text{C}}{13,7}$
Thermal conductivity	$\left[ \frac{\text{W}}{\text{m} \cdot \text{K}} \right]$	$\frac{20^{\circ}\text{C}}{44,9}$			

**Heat treatment:**

Soft annealing

Temperature	Cooling	Hardness
680 - 720°C	furnace	max. 248 HB

Normalizing

Temperature	Cooling	
840 - 880°C	air	

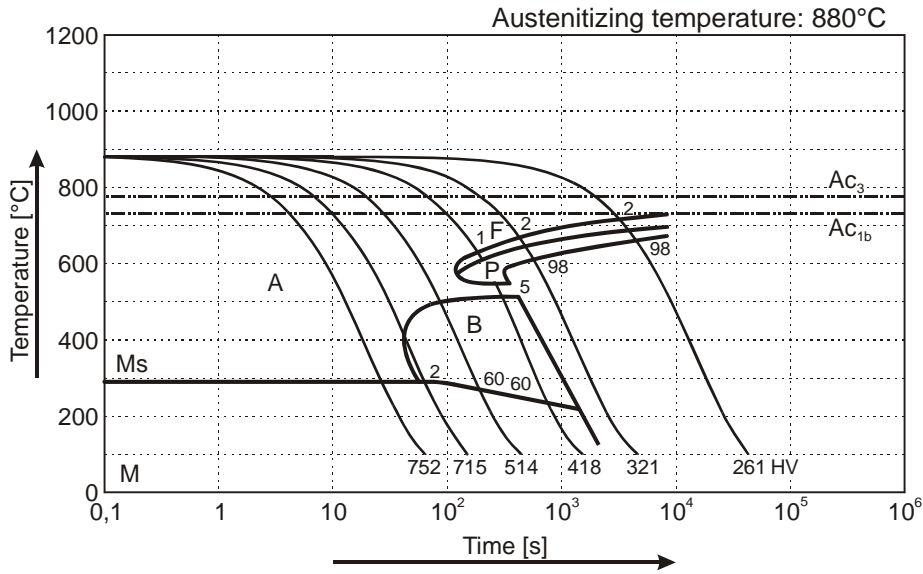
Hardening

Temperature	Cooling	Tempering
820 - 860°C	oil	see tempering diagram

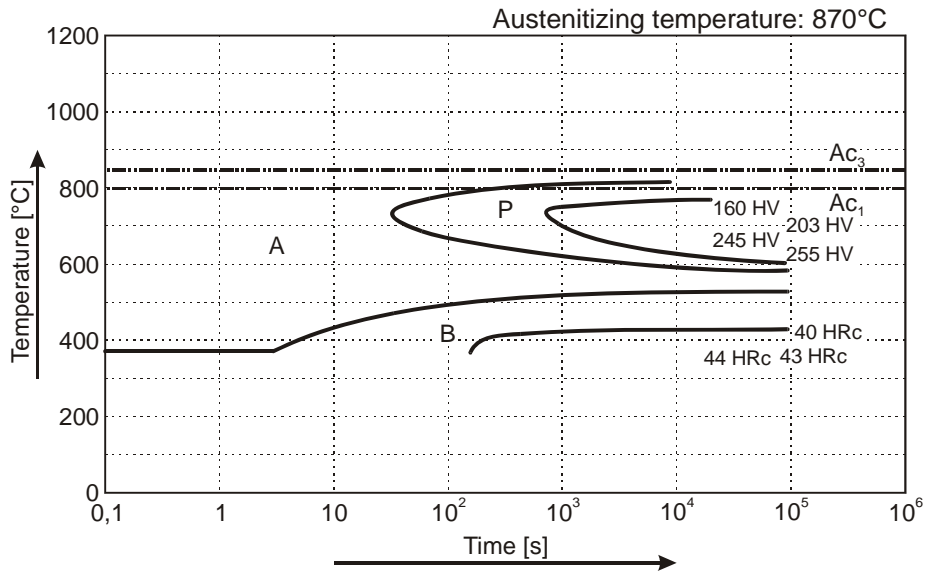
**Mechanical properties in quenched and tempered condition (DIN EN 10083-3:2007-01)**

Diameter d [mm]	≤ 16	>16 - 40	>40 - 100	>100 - 160	>160 - 250
Thickness t [mm]	≤ 8	>8 - 20	>20 - 60	>60 - 100	>100 - 160
Yield strength $R_e$ [N/mm <sup>2</sup> ]	min. 900	min. 800	min. 700	min. 650	min. 600
Tensile strength $R_m$ [N/mm <sup>2</sup> ]	1100 - 1300	1000 - 1200	900 - 1100	850 - 1000	800 - 950
Elongation A [%]	min. 9	min. 10	min. 12	min. 13	min. 13
Reduction Z [%]	min. 40	min. 45	min. 50	min. 50	min. 50
Toughness CVN [J]	min. 30	min. 30	min. 30	min. 30	min. 30

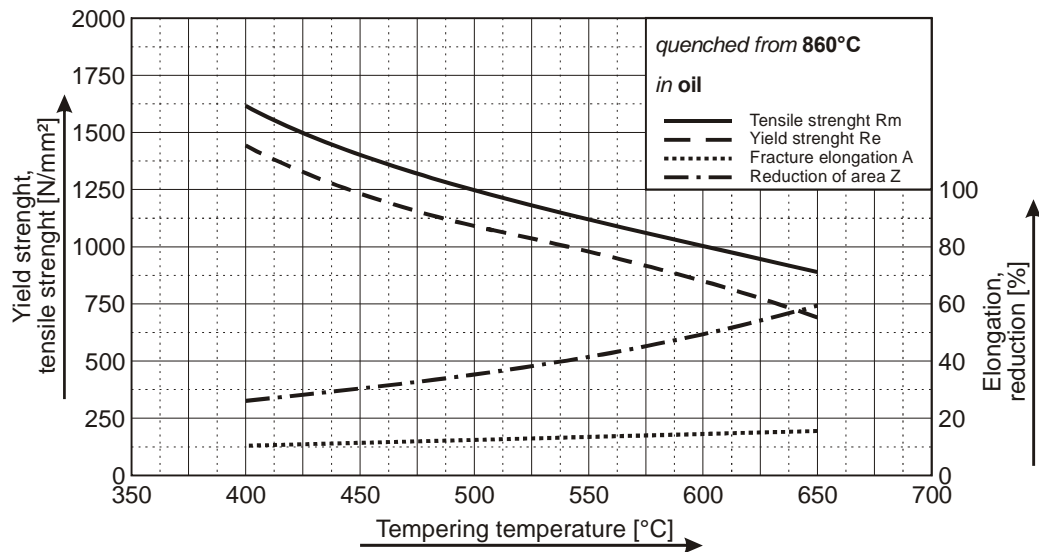
### (1.8159) Continuous Cooling Transformation Diagram (CCT)



### Time Temperature Transformation Diagram (TTT)



### Tempering Diagram



Remarks: All technical information is for reference only.