

Material No.: Code:  
**1.8519 31CrMoV9**

DE - Brand:  
**KHD**

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

C	Cr	Mo	V				
0,31	2,50	0,20	0,15				

**Steel properties:**

CrMoV-alloyed nitriding steel with a surface hardness after nitriding of minimum 800 HV.

**Applications:**

Spindles loaded up to highest pressure, screws, controlling parts, bolts, crankshafts.

**Condition of delivery:**

Quenched and tempered

**Physical properties:**

Thermal expansion coefficient	$\left[ \frac{10^{-6} \cdot \text{m}}{\text{m} \cdot \text{K}} \right]$	20-100°C	20-200°C	20-300°C	20-400°C
		12,1	12,7	13,2	13,6
Thermal conductivity	$\left[ \frac{\text{W}}{\text{m} \cdot \text{K}} \right]$	20°C			
		25,7			

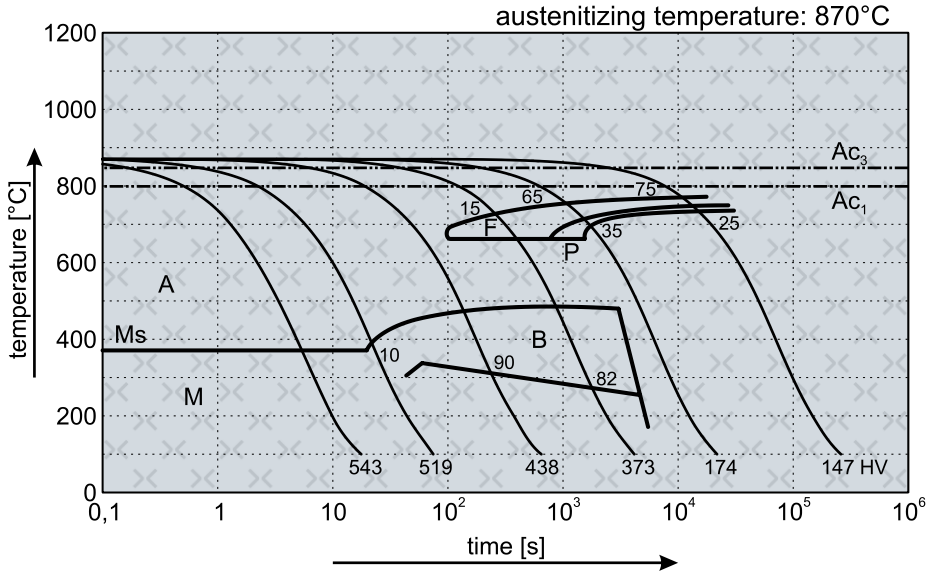
**Heat treatment:**

Soft annealing	<b>Temperature</b>	<b>Cooling</b>	<b>Hardness</b>
	680 - 720°C	furnace	max. 248 HB
Normalizing	<b>Temperature</b>	<b>Cooling</b>	
	870 - 900°C	air	
Hardening	<b>Temperature</b>	<b>Cooling</b>	<b>Tempering</b>
	840 - 880°C	oil, water	see tempering diagram

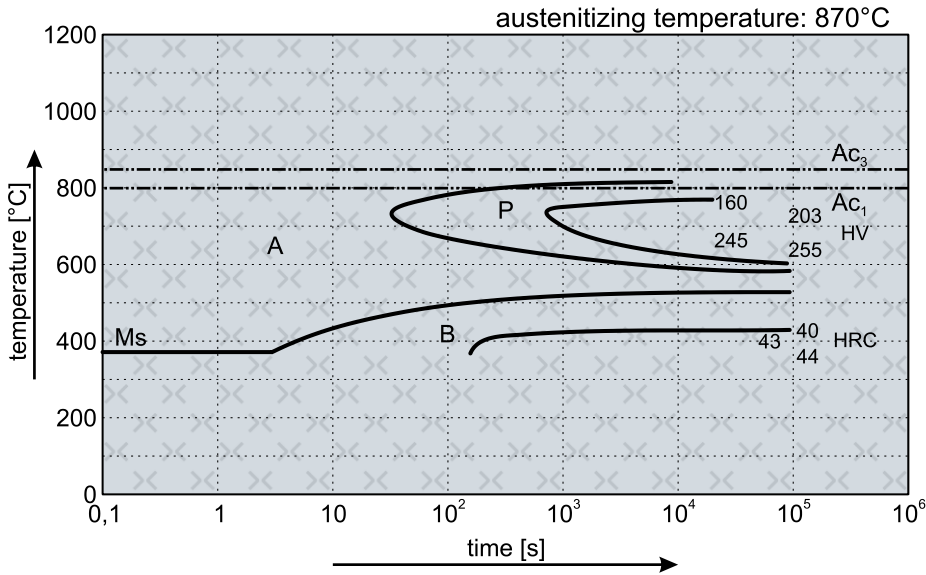
**Mechanical properties in quenched and tempered condition (DIN EN ISO 683-5:2021-08)**

<b>Diameter [mm]</b>	<b>16 ≤ d ≤ 40</b>	<b>40 &lt; d ≤ 100</b>	<b>100 &lt; d ≤ 160</b>	<b>160 &lt; d ≤ 250</b>
<b>Yield strength R<sub>e</sub> [N/mm<sup>2</sup>]</b>	min. 900	min. 800	min. 700	min. 650
<b>Tensile strength R<sub>m</sub> [N/mm<sup>2</sup>]</b>	1100 - 1300	1000 - 1200	900 - 1100	850 - 1050
<b>Elongation A [%]</b>	min. 9	min. 10	min. 11	min. 12
<b>Toughness CVN [J]</b>	min. 25	min. 30	min. 35	min. 40

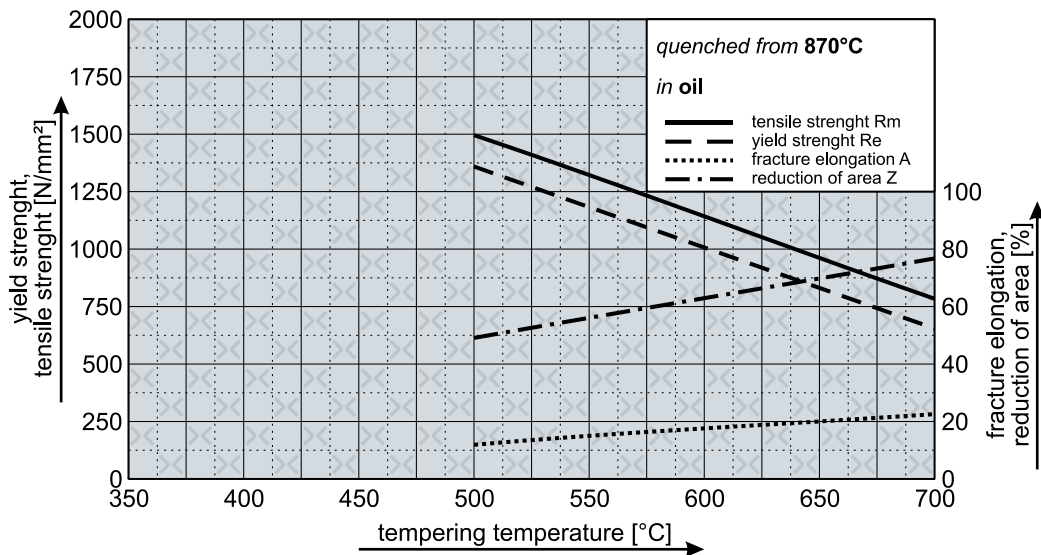
### (1.8519) Continuous Cooling Transformation Diagram (CCT)



### Time Temperature Transformation Diagram (TTT)



### Tempering Diagram



Remarks: All technical information is for reference only.