



HEAT RESISTANT STEELS

# BÖHLER T567



## PROPERTIES

Creep resisting steel, hardenable and tempered. Usual upper temperature limit for continuous operating 650 °C.

### Application

Components featuring elevated high temperature strength for use in thermal engines and power plants.

## CHEMICAL COMPOSITION

(Average %)

C	Si	Mn	Cr	Mo	Ni	V
0.10	0.25	0.50	9.20	0.95	0,30	0.22

Nb	N
0.08	0.040

## STANDARDS

DIN/EN	ASTM	BS
1.4903 X10CrMoVNb9-1 EN 10302 (VdTUV WBI 511/3)		

## HOT FORMING

### Forging

1100 – 850°C

## HEAT TREATMENT

### Annealing

750 to 780 °C / air or cooling in furnace

### Stress relieving

740 to 770°C / cooling on air

After temperature equalization, soak for 1 to 2 hours in controlled atmosphere.

### Hardening

1040 to 1080 °C/Oil, air

### Tempering

730 to 780°C/air, soaking time min. 1 h

### Micro structure:

Martensitic (hardened and tempered condition)

## WELDING:

Preheating and inter-pass temperature 200°C - 300°C, the inter-pass temperature should not exceed 350°C. After welding the work piece have to be slowly cooled below 80°C, holding time 1 hour minimum.

The post weld heat treatment consists of hardening and tempering as mentioned above or a tempering after welding at 740 to 770°C, heating and cooling rate below 550°C max. 150°C/h, above 550°C max. 80°C/hour, soaking time 2 hours at minimum, cooling in air.

The root pass should principally be welded acc. the TIG process with welding rods of analogous composition. Filler and cover passes should be welded with shielded metal arc welding (SMAW) or especially for wall thickness above 15 mm with SA process.

### Filler metals:

BÖHLER C 9 MV-IG

BÖHLER C 9 MV-UP

BÖHLER FOX C 9 MV



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**MECHANICAL PROPERTIES** at room temperature (condition hardened and tempered)

<b>R<sub>p0,2</sub></b> N/mm <sup>2</sup>	<b>R<sub>m</sub></b> N/mm <sup>2</sup>	<b>A<sub>5</sub></b> %	<b>Charpy-V</b> J
≥ 450	620 - 850	≥ 18	68

**HIGH TEMPERATURE PROPERTIES** (condition hardened and tempered)

Temperature	200°C	350°C	450°C	500°C	550°C	600°C	650°C
0.2% proof stress N/mm <sup>2</sup>	380	350	320	300	270	215	--

**LONG TIME HIGH TEMPERATURE PROPERTIES** (condition hardened and tempered) <sup>1, 2)</sup>

Creep rupture strength, N/mm<sup>2</sup> (mean values)

Hours	Temperature				
	470°C	500°C	550°C	600°C	650°C
100 000	317	253	162	90	44

**PHYSICAL PROPERTIES** <sup>1)</sup>

Density at	20°C	7.70	g/cm <sup>3</sup>
Thermal conductivity at	20°C	26.0	W/(m.K)
	500°C	31.0	
Specific heat at	20°C	0.43	J/(g.K)
	500°C	0.68	
Electric resistivity at	20°C	0.50	Ohm.mm <sup>2</sup> /m
Modulus of elasticity at	20°C	218 x 10 <sup>3</sup>	N/mm <sup>2</sup>
Magnetic properties		magnetic	

**THERMAL EXPANSION** between 20°C and ....°C, 10<sup>-6</sup> K<sup>-1</sup>) <sup>1)</sup>

50°C	100°C	200°C	300°C	400°C	500°C	550°C	600°C	650°C
10.9	11.9	11.3	11.7	12.0	12.3	12.4	12.6	12.7

<sup>1)</sup> Only for information (values according EN 10302).

<sup>2)</sup> The values given above were derived as mean values with a scatter band of ± 20%.