

<b>Quality</b>	<b>90MnCrV8</b>	Supply conditions:
According to standards	UNI EN ISO 4957: 2002	Annealed
Number	<b>1.2842</b>	

## Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	V%
0,85-0,95	0,10-0,40	1,80-2,20	0,030	0,030	0,20-0,50	0,05-0,20
± 0.03	± 0.03	± 0.08	+ 0.005	+ 0.005	± 0.05	± 0.02

Product deviations are allowed

## Temperature °C

Hot-forming	Stress-relieving after machining and before quenching	Pre-heating	Quenching	Tempering	
1050-850	650 furnace cooling to 320, then air	400 pause, then 650, pause, then ▲	▲ 790-820 oil, polymer or salt bath at 200-250 °C	180-220 calm air minimum 2 cycles	
Soft annealing	Isothermal annealing	Pre-heating welding		Stress-relieving after welding	
700 calm air  (HB max 229)	780 furnace cooling to 690, then furnace cooling to 650, then air (HB max 220)	250-300		650 furnace cooling	
		<b>Ac1</b>	<b>Ac3</b>	<b>Ms</b>	<b>Mf</b>
		720	750	190	-20 <sup>b)</sup>

<sup>b)</sup> subcooling

the symbol ▲ indicates the temperature rise to .....°C ▲

## Mechanical and physical properties

Table of tempering after quenching at 790 °C in oil										
<b>HB</b>	739	722	706	688	654	595	543	496	390	353
<b>HRC</b>	65	64	63	62	60	57	54	51	42	38
<b>N/mm<sup>2</sup></b>						2240	2010	1820	1340	1180
Tempering at °C	<b>50</b>	<b>100</b>	<b>150</b>	<b>200</b>	<b>250</b>	<b>300</b>	<b>350</b>	<b>400</b>	<b>500</b>	<b>600</b>

HRC round quenched at 810 °C in oil			
mm	surface	½ radius	centre
Ø 40	65	64	64
Ø 50	65	64	63
Ø 60	64	63	62
Ø 70	64	58	52

<b>Modulus of elasticity</b>	longitudinal GPa	210						
<b>Modulus of elasticity</b>	tangential GPa	80						
<b>Thermal expansion</b>	10 <sup>-6</sup> · K <sup>-1</sup>		11.5	12.0	12.2	12.5	12.8	
<b>Thermal conductivity</b>	W/(m·K)	30.0						
<b>Specific heat capacity</b>	J/(Kg·K)	460						
<b>Specific electric resist.</b>	Ohm·mm <sup>2</sup> /m	0.35						
<b>Electrical conductivity</b>	Siemens·m/mm <sup>2</sup>	2.85						
<b>Density</b>	Kg/dm <sup>3</sup>	7.85						
Testing at	°C	<b>20</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>500</b>	

## Cold-work tool steels

- manganese-chromium-vanadium steel grade
- indeformable during quenching, wearproof and tough
- not recommended for those tools which reach high operating temperatures
- applications: *long-shaped dies, matrix, drawing punches, master gauges, dies for plastics, circular blades, slides, paper shears, tools for the working of the wood*