

<b>Quality</b>	<b>90MnCrV8</b>	Supply conditions:	<i>Technical card</i>
According to standards	<b>UNI EN ISO 4957: 2002</b>	Annealed HB max 229	<b>Lucefin Group</b>
Number	<b>1.2842</b>		rev. 2018

### 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  <b>+Q</b>	Tempering  <b>+T</b>
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 +A	Isothermal annealing +I		Pre-heating welding	Stress-relieving after welding
700 calm air	780 furnace cooling to 690, then furnace cooling to 650, then air (HB max 220)		250-300	650 furnace cooling
(HB max 229)			<b>Ac1</b>	<b>Ac3</b>
			720	750
			<b>Ms</b>	<b>Mf</b>
			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

HB	739	722	706	688	654	595	543	496	390	353
<b>HRC</b>	65	64	63	62	60	57	54	51	42	38
<b>R 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>Thermal expansion</b>	10 <sup>-6</sup> • K <sup>-1</sup>	▶	11.5	12.0	12.2	12.5	12.8	
<b>Modulus of elasticity long.</b>	GPa		210					
<b>Modulus of elasticity tang.</b>	GPa		80					
<b>Specific heat capacity</b>	J/(Kg•K)		460					
<b>Thermal conductivity</b>	W/(m•K)		30.0					
<b>Density</b>	Kg/dm <sup>3</sup>		7.85					
<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					
°C			<b>20</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>500</b>

The symbol ▶ indicates temperature between 20 °C and 100 °C, 20 °C and 200 °C ...

Europe EN	Germany DIN	China GB	Japan JIS	India IS	R. of Korea KS	Russia GOST	USA AISI/SAE
90MnCrV8	90MnCrV8	9Mn2V				9G2F	O2

### 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*