

<b>Quality</b>	<b>40CrMnMo7</b>	Supply conditions:
According to standards	Werkstoff	Quenched and Tempered
Number	<b>1.2311</b>	

## Chemical composition

C%	Si%	Mn%	P%	S%	Cr%	Mo%
0,35-0,45	0,20-0,40	1,30-1,60	max 0,035	max 0,035	1,80-2,10	0,15-0,25
± 0.03	± 0.03	± 0.04	+ 0.005	+ 0.005	± 0.05	± 0.03

Products deviations are allowed

## Temperature °C

Hot-forming	Quenching <sup>1)</sup>	Tempering <sup>1)</sup>	Quenching <sup>2)</sup>	Tempering <sup>2)</sup>
1050-850	840-870 oil or polymer s.b. (180-210°)	650-670 calm air minimum 2 cycles	860-880 calm or forced air	180-220 calm air
Soft annealing	Stress-relieving	Normalizing	Pre-heating welding	Stress-relieving after welding
720-780 furnace cooling (HB max 230)	50° under the temperature of tempering	850-900 air	250-300	650 furnace cooling
			<b>Ac1</b>	<b>Ac3</b>
			760	800
				<b>Ms</b>
				260
				<b>Mf</b>
				140

s.b. = salt bath

## Mechanical properties

Heat treatment: quenching at 860 °C in oil, tempering at 600 °C

										HB at the depth mm				
N/mm <sup>2</sup>		N/mm <sup>2</sup>		Kv longitudinal J						294	286	264	min	
<b>R</b>	1000	890		8	20	30	40	50	60	75	336	327	311	max
<b>Rp 0.2</b>	880	750									<b>100</b>	<b>200</b>	<b>300</b>	mm
Test at °C	<b>20</b>	<b>200</b>		<b>0</b>	<b>20</b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>120</b>				

## Tempering table after quenching at 860 °C in oil

<b>HB</b>	496	496	489	482	468	455	442	432	409	390	353	336	271	240
<b>HRC</b>	51	51	50.5	50	49	48	47	46	44	42	38	36	28	21
<b>R</b>	N/mm <sup>2</sup>	1820	1820	1790	1760	1700	1640	1580	1520	1430	1340	1180	1110	900
<b>Kv</b>	J						8	8	8	7	9	14	20	30
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>450</b>	<b>500</b>	<b>550</b>	<b>600</b>	<b>650</b>	<b>700</b>

<b>Thermal expansion</b>	10 <sup>-6</sup> • K <sup>-1</sup>				12.8	13.0	13.4	13.8	14.0	14.2	14.4	14.5	
<b>Modulus of elasticity</b>	long. GPa				210			196			177		
<b>Modulus of elasticity</b>	tang. GPa				81			75			68		
Testing at	°C				<b>20</b>	<b>100</b>	<b>200</b>	<b>250</b>	<b>300</b>	<b>400</b>	<b>500</b>	<b>600</b>	<b>700</b>

Specific heat capacity J/(Kg•K)	Density Kg/dm <sup>3</sup>	Thermal conductivity (W/(m•K))			Specific electric resist. Ohm•mm <sup>2</sup> /m	Electrical conductivity Siemens•m/mm <sup>2</sup>
		20 °C	250 °C	500 °C		
460	7.83	34.0	33.4	33.0	0.19	5.26

### Tool steel for plastic moulding and extrusion

- it is obtained through a special production process which allows a high level of micro-purity and microstructural homogeneity
- excellent suitability for photo-engraving, polishing, nitriding, excellent wear resistance and weldability
- applications: *small and medium-sized moulds for the automotive and food industry, moulds for rubber pressing, pressure moulds for thermosetting compounds (SMC Sheet Moulding Compound, BMC Bulk Moulding Compound), bolsters*
- extrusion: *dies and gauges for PVC, mechanical parts for extrusion presses*