

Quality	40CrMnMo7	Supply conditions:
According to standards	Werkstoff	Quenched and Tempered
Number	1.2311	

Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	Mo%
0,35-0,45	0,20-0,40	1,30-1,60	0,035	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 ¹⁾	Tempering ¹⁾	Quenching ²⁾	Tempering ²⁾
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
			Ac1	Ac3
			760	800
				Ms
				260
				Mf
				140

s.b. = salt bath

Mechanical properties

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

Means values to ½ tickness on Ø 400 mm

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

Tempering table after quenching at 860 °C in oil

HB	496	496	489	482	468	455	442	432	409	390	353	336	271	240
HRC	51	51	50.5	50	49	48	47	46	44	42	38	36	28	21
R	N/mm ²	1820	1820	1790	1760	1700	1640	1580	1520	1430	1340	1180	1110	900
Kv	J						8	8	8	7	9	14	20	30
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600	650	700

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

Specific heat capacity J/(Kg•K)	Density Kg/dm ³	Thermal conductivity (W/(m•K))			Specific electric resist. Ohm•mm ² /m	Electrical conductivity Siemens•m/mm ²
		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*