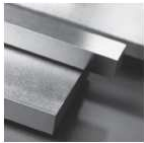


Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.2311
Description	40CrMnMo7
BS	1.2311
AISI/SAE	P20
Search for alternatives in the ABRAMS STEEL GUIDE®	www.steel-guide.co.uk/alternatives/1.2311

Specifications



Precision flat steel with machining allowance [PFS/BA]
L: 500 mm
L: 1,000 mm



Precision round steel with machining allowance [PRS/BA]
peeled / rough-turned
L: 500 mm
L: 1,000 mm

Chemical composition BS 1.2311 (reference value %)

C	Si	Mn	P	S	Cr	Mo
0.35 – 0.45	0.2 – 0.4	1.3 – 1.6	0 – 0.035	0 – 0.035	1.8 – 2.1	0.15 – 0.25

Physical properties

Hardness (delivery condition)	max. 325 HB, tempered						
Tensile strength R_m (as received condition)	approx. 1100 N/mm ²						
Working hardness	max. 50 HRC						
Thermal expansion coefficient $10^{-6}m/(m \cdot K)$	20 - 100°C	20 - 200°C	20 - 300°C	20 - 350°C	20 - 400°C	20 - 450°C	20 - 500°C
	12.6	13.0	13.5	13.7	13.9	14.1	14.3
Thermal conductivity $W/(m \cdot K)$	23°C	150°C	300°C	350°C	400°C	500°C	
	32.5	32.9	31.3	30.2	29.5	27.4	

Technical properties

Pre-hardened cold work steel and plastic mould steel. Good polishability and easily etched. High through-hardening and uniform component strength.

Applications

Mechanical engineering, jigs, base plates, assembling parts, moulding frames, plastic moulds, plastic processing, injection moulds, die casting moulds, hydroforming tools, recipient sleeves, intermediate sleeves, folding bars, tool holders, extrusion presses, tube presses, die holders, die inserts.

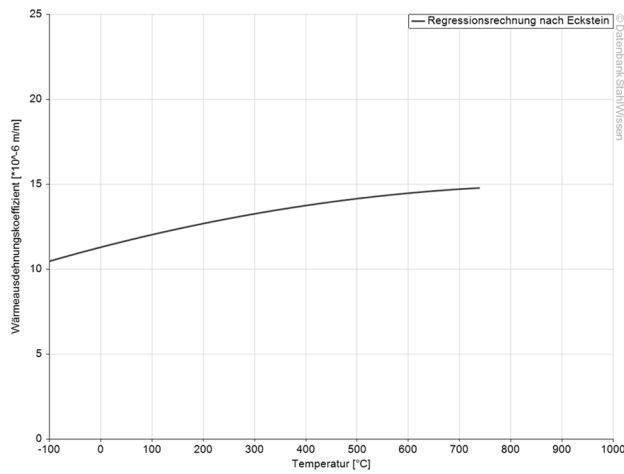


Heat treatment

	Temperature	Cooling	Hardness				
Soft annealing	710 - 740°C	Furnace	max. 325 HB				
	Temperature	Cooling	Hardness				
Stress relief annealing	550 - 600°C	Furnace					
	Temperature	Quenching in	Hardness after quenching				
Hardening	840 - 870°C	Oil, hot basin (180 - 220°C)	51 HRC				
	100°C	200°C	300°C	400°C	500°C	600°C	700°C
Tempering	51 HRC	50 HRC	48 HRC	46 HRC	42 HRC	36 HRC	28 HRC

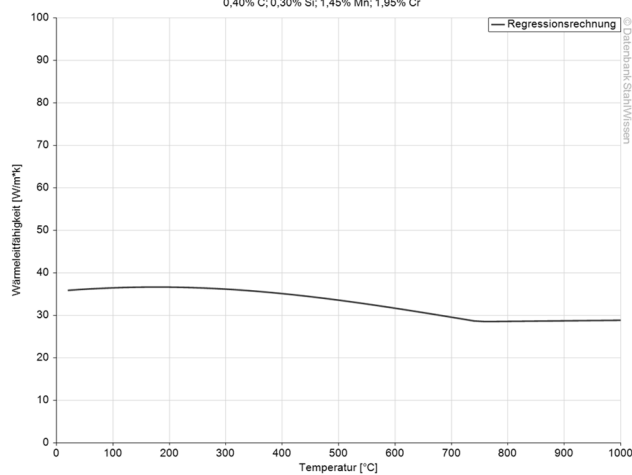
Thermal expansion coefficient diagram

Werkstoff: 40CrMnMo7, 1.2311



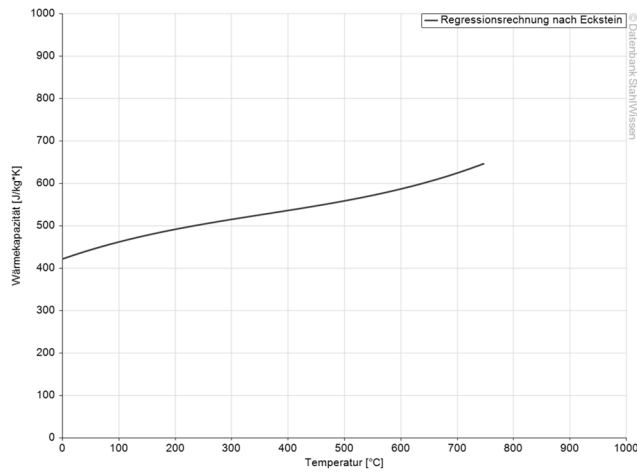
Thermal conductivity diagram

Werkstoff: 40CrMnMo7, 1.2311
Regressionsrechnung mit folgender Analyse:
0,40% C; 0,30% Si; 1,45% Mn; 1,95% Cr



Thermal capacity diagram

Werkstoff: 40CrMnMo7, 1.2311

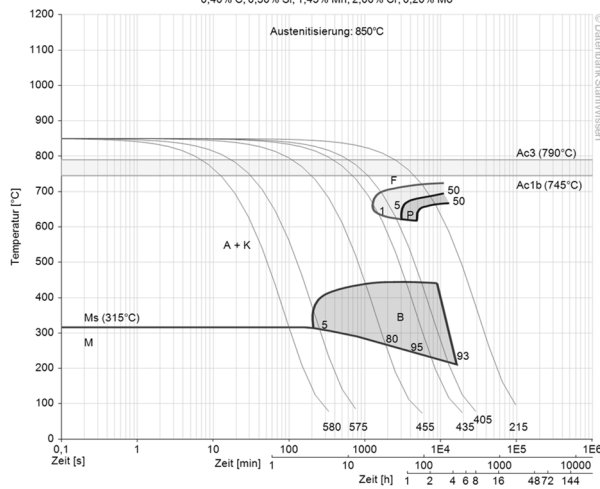


Continuous ZTU-diagram

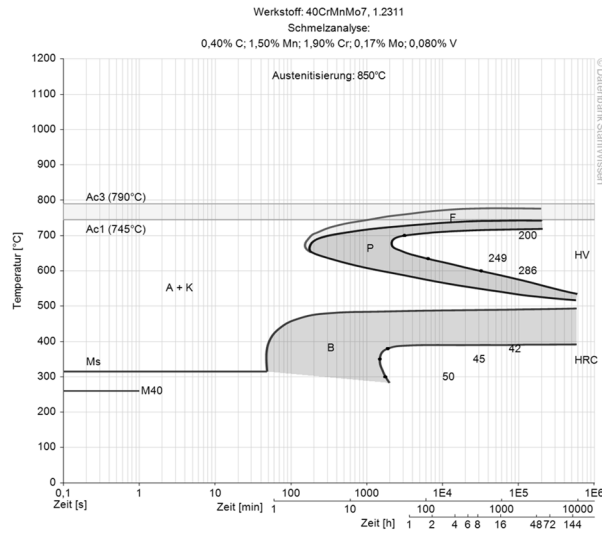
Werkstoff: 40CrMnMo7, 1.2311

Schmelzanalyse:
0,40% C; 0,30% Si; 1,45% Mn; 2,00% Cr; 0,20% Mo

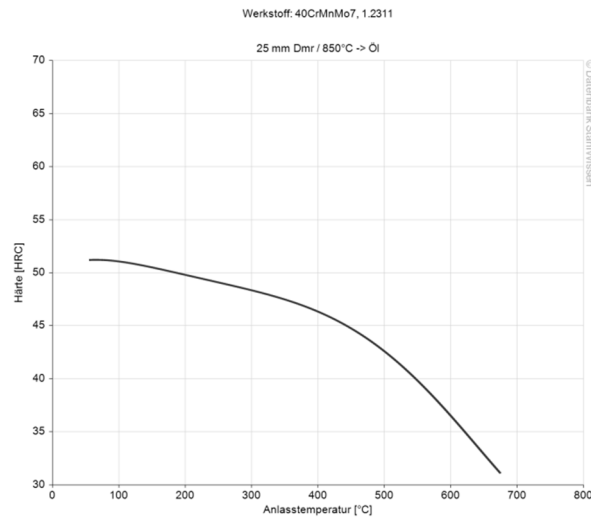
Austenilisierung: 850°C



Isothermal ZTU-diagram



Tempering diagram



The data shown here is to be used only as an indication of the statistics, thus we accept no liability.
 Diagrams are taken from Datenbank StahlWissen - Dr. Sommer Werkstofftechnik
 Issued: 2012

