

Steel grade

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

Specifications



Precision flat steel with machining allowance [PFS/BA]
L: 500 mm
L: 1.000 mm



Precision round steel without machining allowance [PRS]
bright ground, ISO h8
L: 1.000 mm



Precision round steel with machining allowance [PRS/BA]
peeled / rough-turned
L: 500 mm
L: 1.000 mm

Chemical composition AISI/SAE P20 (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. 1.100 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 insert.

Heat treatment

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

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Divisions of
ABRAMS Industries GmbH & Co. KG
Hannoversche Str. 38 / 46
49084 Osnabrück
Germany

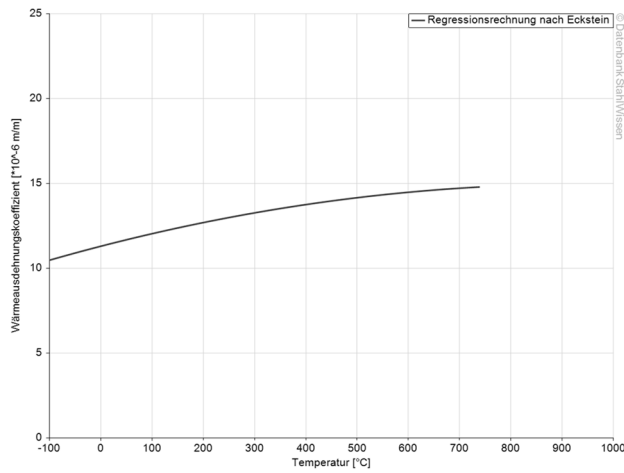
County court Osnabrück / Germany, HRA 6865
GP: ABRAMS Industries Verwaltungs GmbH
Country court Osnabrück / Germany, HRB 20019
CEO: Dipl.-Wi.-Ing. Dr. Jürgen Abrams
COO: Ms. Nur H. Nezir, LL.B.
T: +49 541 / 357 39-0
sales@abrams-industries.eu
www.abrams-industries.eu/shop
VAT-No.: DE221940667

Bank details:
Bank: Sparkasse Osnabrück / Germany
SWIFT / BIC: NOLADE22
IBAN: DE63 2655 0105 1522 9268 96



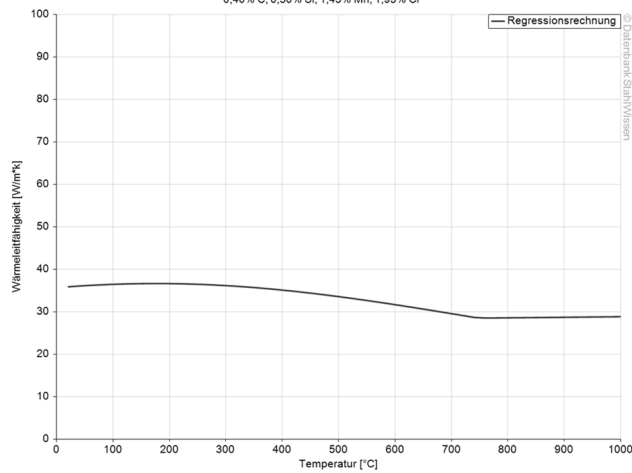
Thermal expansion coefficient diagram

Werkstoff: 40CrMnMo7, 1.2311



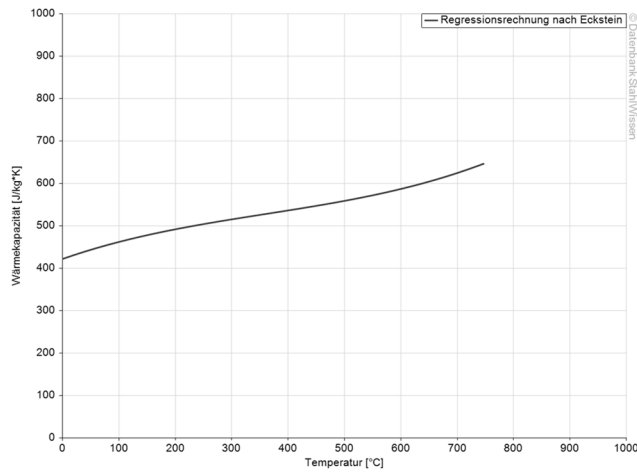
Thermal conductivity diagram

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

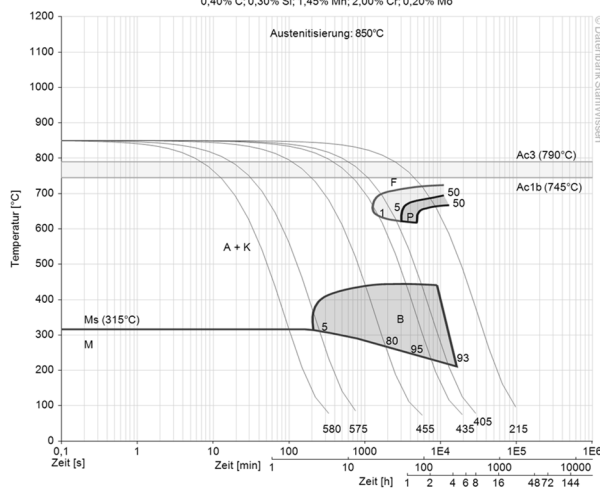


Continuous ZTU-diagram

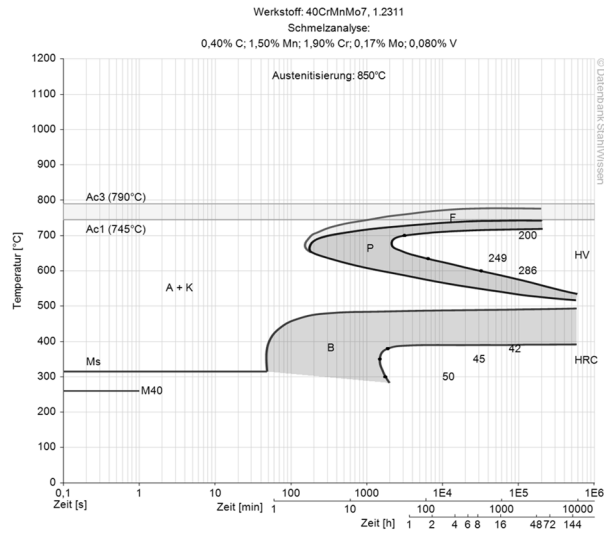
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Schmelzanalyse:
0,40% C, 0,30% Si; 1,45% Mn; 2,00% Cr; 0,20% Mo

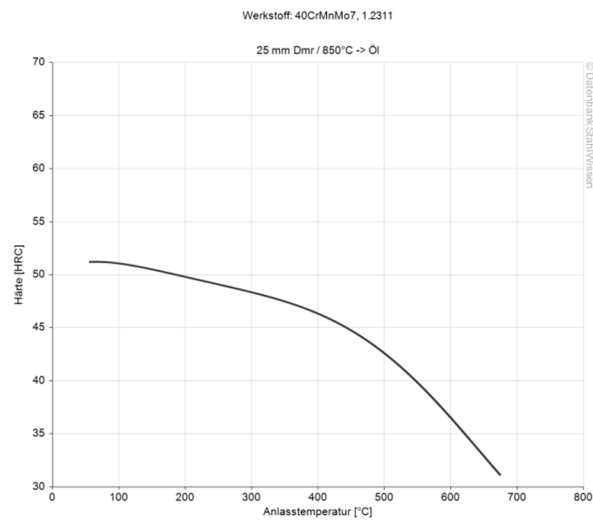
Austenilisierung: 850°C



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

