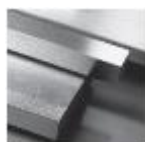


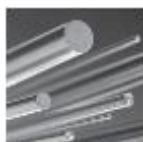
Steel grade

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
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

Machine construction, 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

ABRAMS PREMIUM STEEL

is a registered trademark of
Abrams Engineering Services GmbH & Co. KG
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Managing Director: Dipl.-Wi.-Ing. Dr. Juergen Abrams

Amtsgericht Osnabrueck / Germany, HRA 6865
VAT-No.: DE 221940667
General Partner: Abrams Engineering Verwaltungs GmbH
Amtsgericht Osnabrueck / Germany, HRB 20019

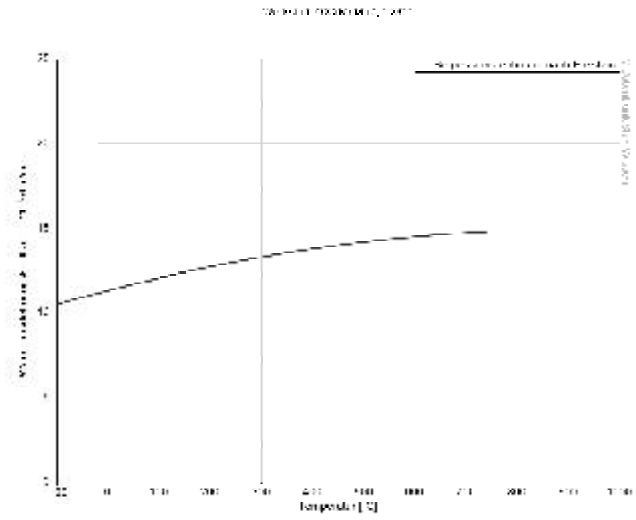
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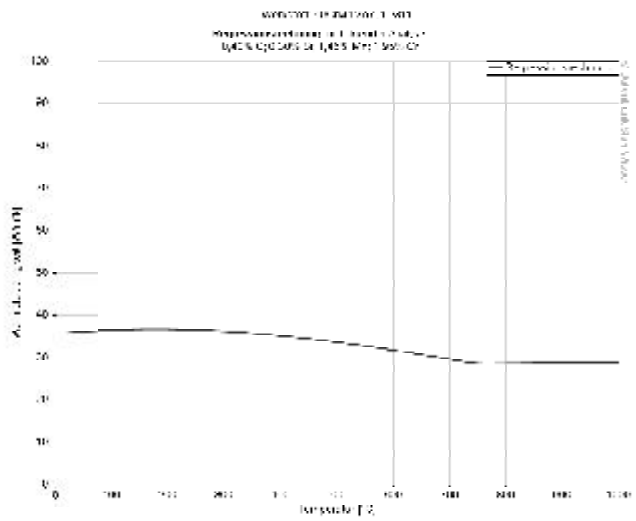
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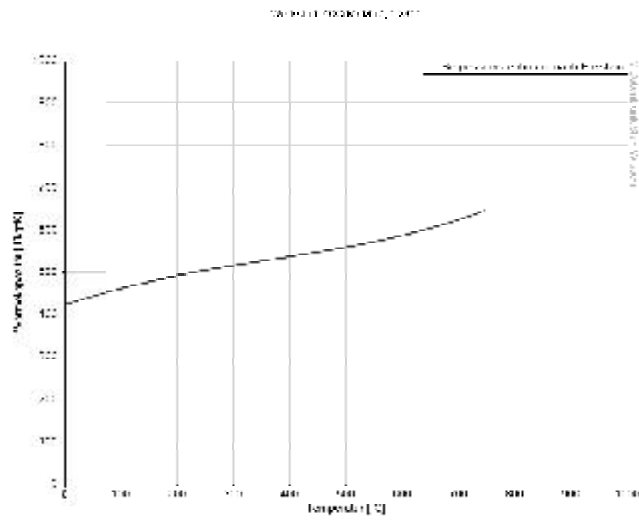
Thermal expansion coefficient diagram



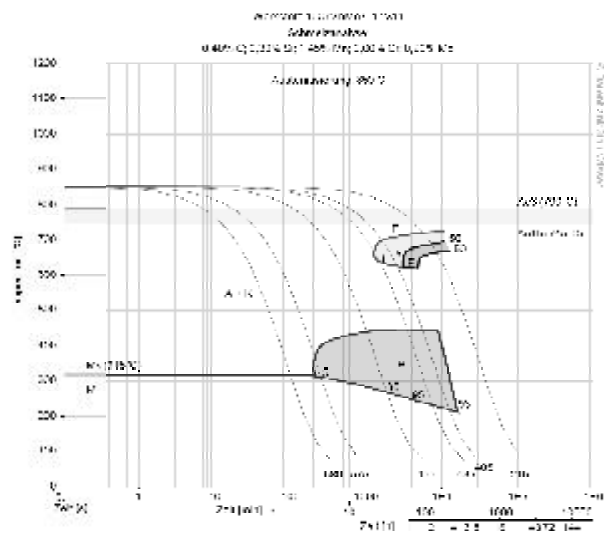
Thermal conductivity diagram



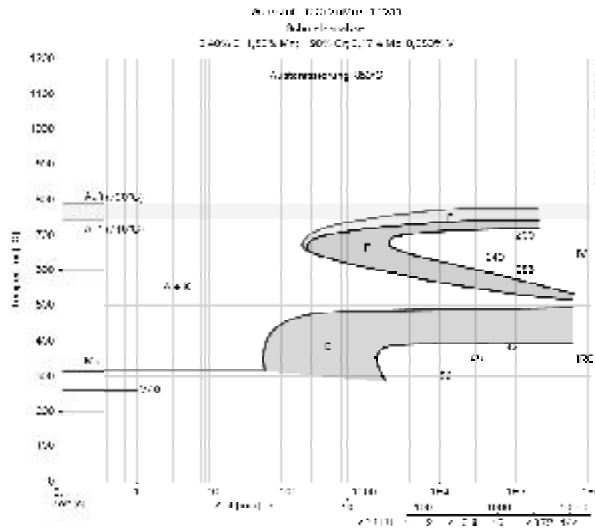
Thermal capacity diagram



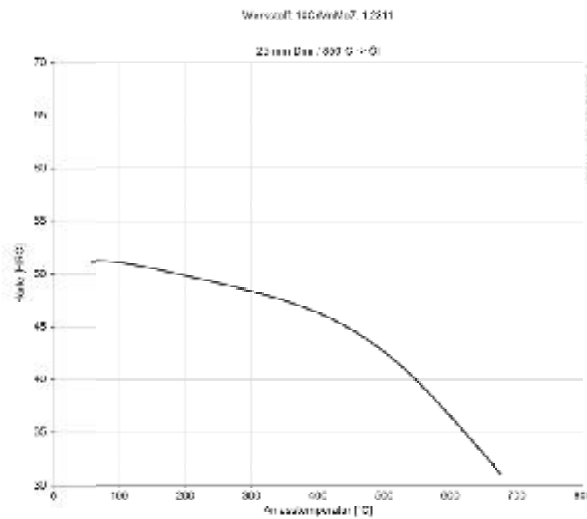
Continuous ZTU-diagram



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

