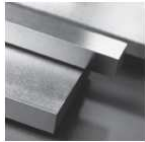


## Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.2312
Description	40CrMnMoS8-6
AISI/SAE	P20+S
Search for alternatives in the ABRAMS STEEL GUIDE®	<a href="http://www.steel-guide.eu/alternatives/P20S">www.steel-guide.eu/alternatives/P20S</a>

## 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+S (reference value %)

C	Si	Mn	P	S	Cr	Mo
0,35 - 0,45	0,3 - 0,5	1,4 - 1,6	0 - 0,03	0,05 - 0,1	1,8 - 2,0	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 <sup>2</sup>				
Working hardness	max. 50 HRC				
Thermal expansion coefficient $10^{-6}m/(m \cdot K)$	20 - 100°C	20 - 200°C	20 - 300°C		
	Annealed	12,5	13,4	13,9	
Tempered	12,3	13,0	13,7		
Thermal conductivity $W/(m \cdot K)$	100°C	150°C	200°C	250°C	300°C
	Annealed	40,2	40,9	40,3	40,0
Tempered	39,8	40,4	40,4	39,9	39,0

## Technical properties

Pre-hardened cold work steel and plastic mould steel. Good machinability, although less polishable and more difficult to etch, due to added sulphur. High through-hardening and uniform component strength.

## Applications

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

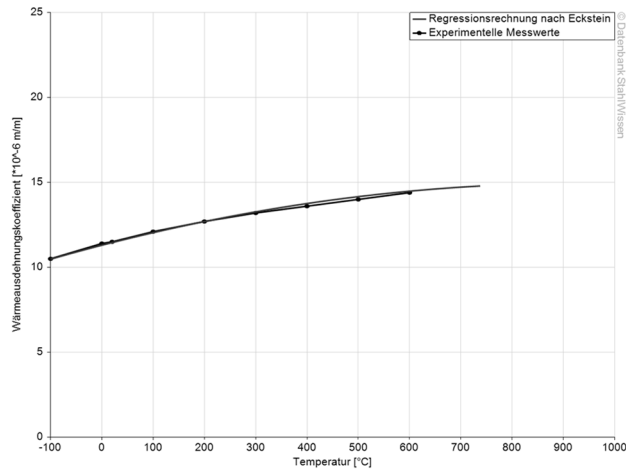


## Heat treatment

	Temperature	Cooling	Hardness				
Soft annealing	710 - 740°C	Furnace	max. 325 HB				
Stress relief annealing	580 - 620°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

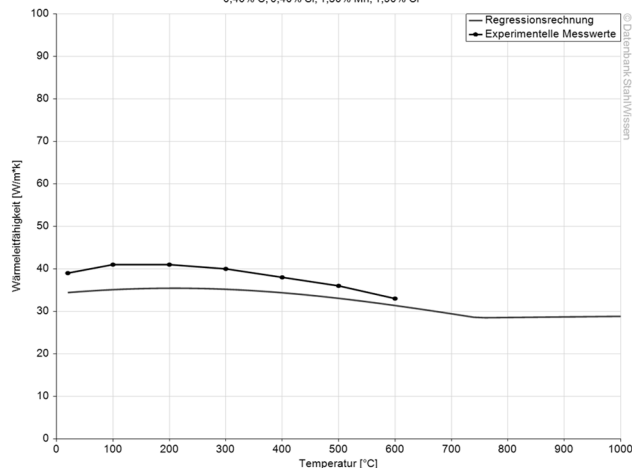
## Thermal expansion coefficient diagram

Werkstoff: 40CrMnMoS8-6, 1.2312



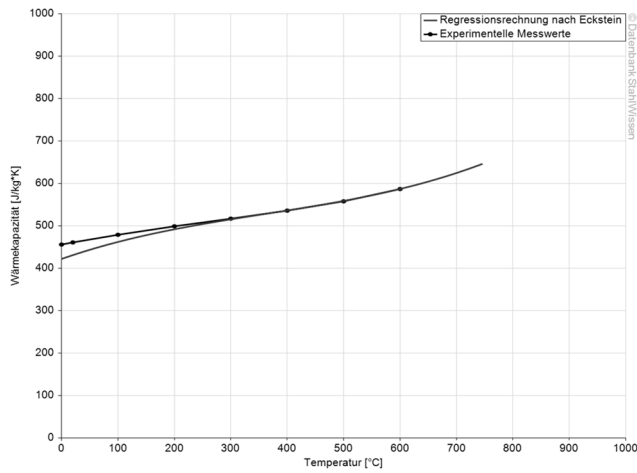
## Thermal conductivity diagram

Werkstoff: 40CrMnMoS8-6, 1.2312  
 Regressionsrechnung mit folgender Analyse:  
 0,40% C; 0,40% Si; 1,50% Mn; 1,90% Cr



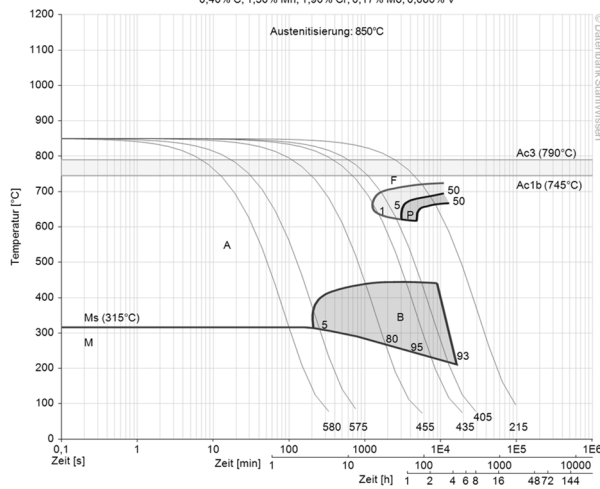
## Thermal capacity diagram

Werkstoff: 40CrMnMoS8-6, 1.2312

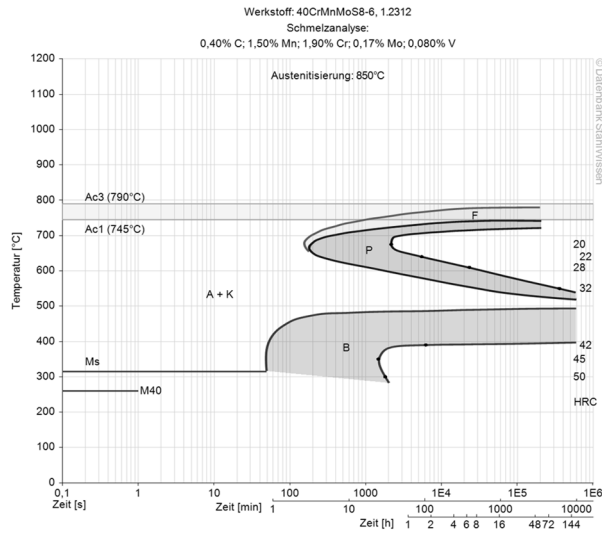


## Continuous ZTU-diagram

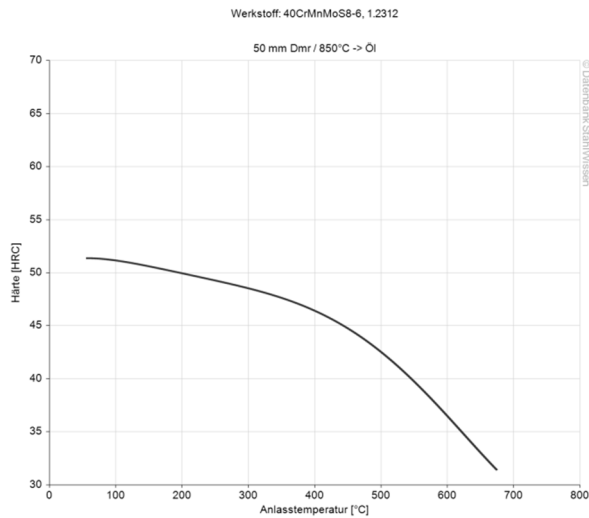
Werkstoff: 40CrMnMoS8-6, 1.2312  
Schmelzanalyse:  
0,40% C; 1,50% Mn; 1,90% Cr; 0,17% Mo; 0,080% V



## 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

