

## Steel grade

Material No.	PREMIUM 52100/L1
AISI	52100/ L1
Search for alternatives in the ABRAMS STEEL GUIDE	<a href="http://www.abrams-steelguide.com/alternatives/52100-L1">www.abrams-steelguide.com/alternatives/52100-L1</a>

## Shapes



**Smart Flat Stock [Smart]  
Standardized Precision Blanks**  
L: 12"  
L: 24"



**Smart Flat Stock Metric [SmartM]  
Standardized Precision Blanks Metric**  
L: 300 mm  
L: 600 mm

## Chemical composition AISI 52100 / L1 (reference value %)

C	Si	Mn	P	S	Cr	Mo	Ni
0.95 - 1.1	0.15 - 0.35	0.2 - 0.4	0 - 0.025	0 - 0.025	1.35 - 1.6	0 - 0.1	0 - 0.4

## Physical properties

Hardness (delivery condition)	max. 223 HB, annealed			
Tensile strength $R_m$ (as received condition)	approx. 108.7 KSI			
Working hardness	max. 64 HRC			
Thermal expansion coefficient $10^{-6}m/(m \cdot K)$	68 - 212°F	68 - 392°F	68 - 572°F	68 - 752°F
	12.3	13.4	13.7	14.1
Thermal conductivity $W/(m \cdot K)$	68°F	662°F	1292°F	
	33.0	32.2	31.4	

## Technical properties

An all purpose medium alloyed cold work tool steel with high hardenability, but low depth of hardening, good wear resistance and toughness. This steel grade belongs to the group of AISI L1 (roller bearing and ball bearing steel).

## Applications

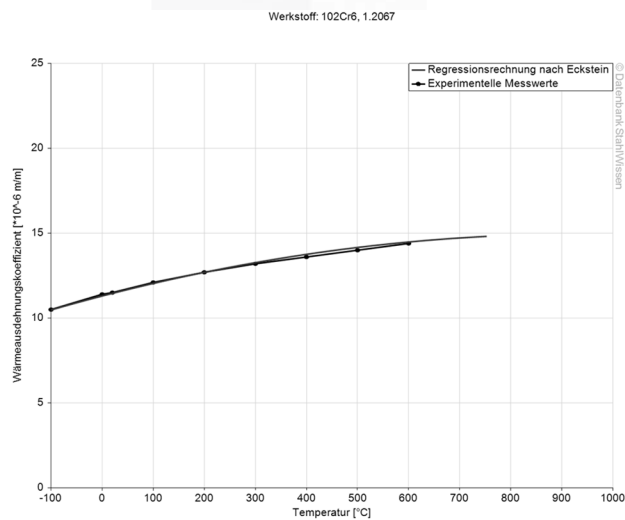
Drills, threading tools, center lathes, milling cutters, reamers, small die plates, pressure rollers, cold rollings, measuring tools, cold pilger rollings, cold pilger jaws, gauges, mandrels, woodworking tools, cold extrusion tools, flanging rollers, shear knives, roller bearings, ball bearings (medium to large size).



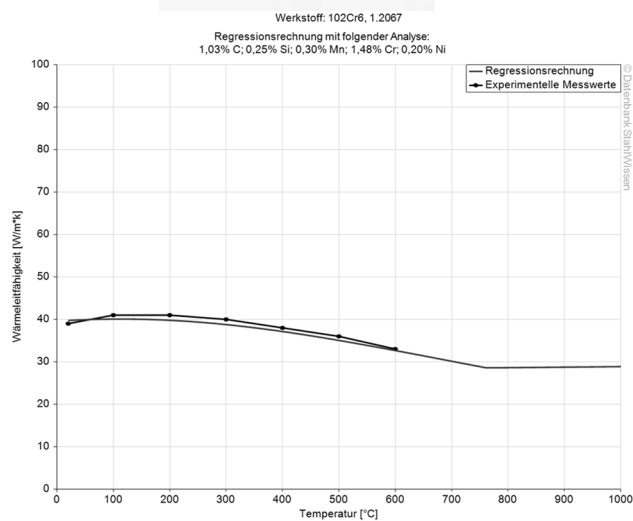
## Heat treatment

Soft annealing	Temperature		Cooling		Hardness	
	1310 - 1382°F		Furnace		max. 223 HB	
Stress relief annealing	Temperature		Cooling			
	approx. 1202°F		Furnace			
Hardening	Temperature		Quenching in		Hardness after quenching	
	1526 - 1580°F		Oil, basin, 356 - 428°F		64 HRC	
Tempering	212°F	392°F	572°F	752°F	932°F	1112°F
	64 HRC	61 HRC	56 HRC	50HRC	44 HRC	36 HRC

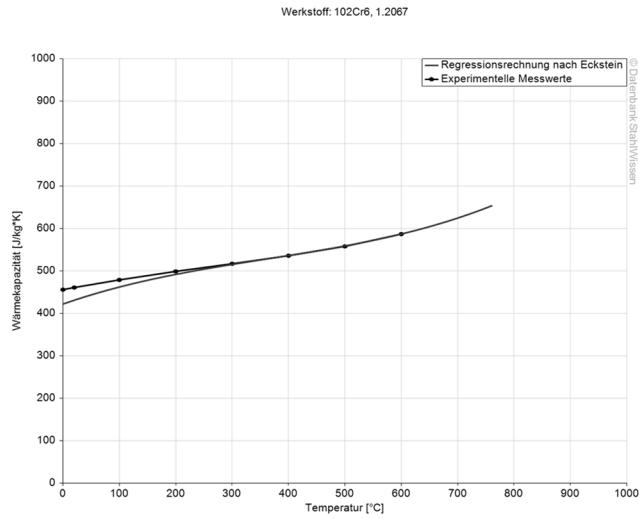
## Thermal expansion coefficient diagram



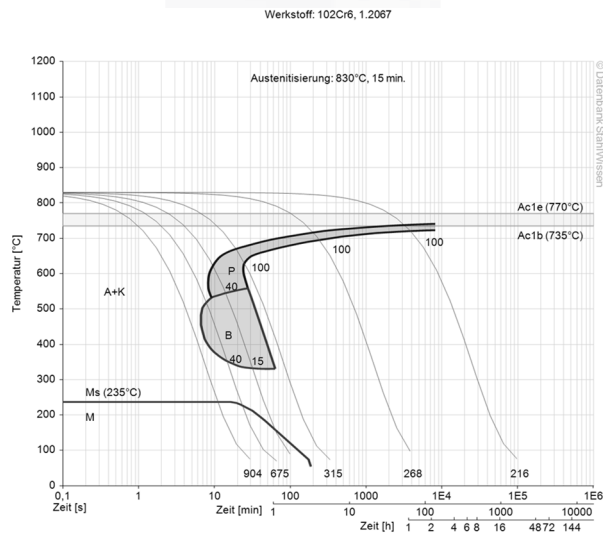
## Thermal conductivity diagram



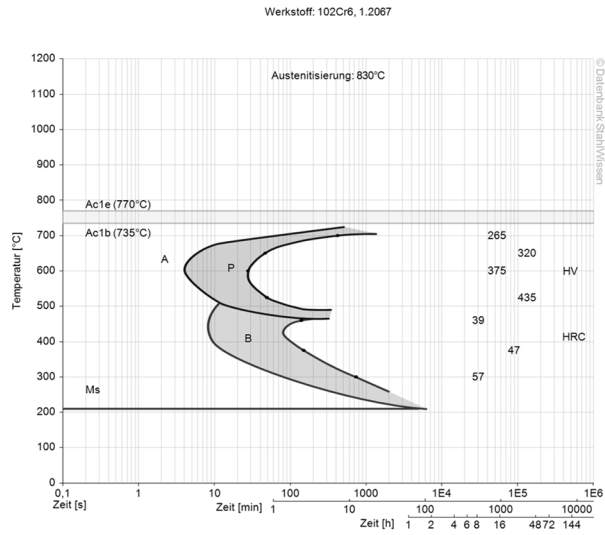
## Thermal capacity diagram



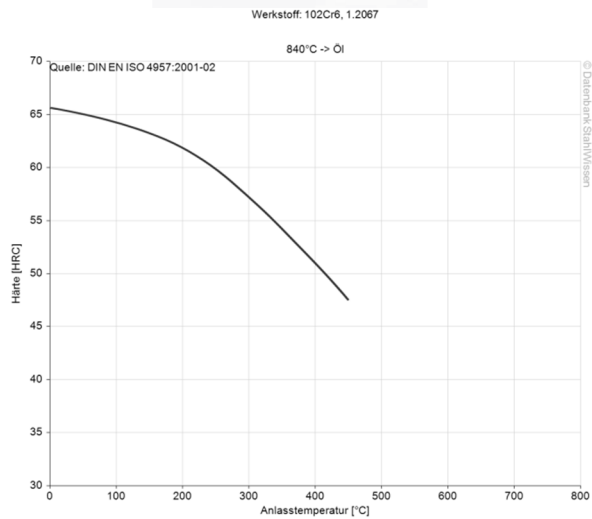
## Continuous ZTU-diagram



## 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

