

## Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.2767 ESU
Description	45NiCrMo16
AISI/SAE	6F7 ESR
Search for alternatives in the ABRAMS STEEL GUIDE®	<a href="http://www.steel-guide.eu/alternatives/6F7ESR">www.steel-guide.eu/alternatives/6F7ESR</a>

## Specifications



€co-Präz\* [€co]  
L: 300 mm  
L: 500 mm

## Chemical composition AISI/SAE 6F7 ESR (reference value %)

C	Si	Mn	P	S	Cr	Mo	Ni
0,4 - 0,5	0,1 - 0,4	0,2 - 0,5	0 - 0,03	0 - 0,03	1,2 - 1,5	0,15 - 0,35	3,8 - 4,3

## Physical properties

Hardness (delivery condition)	max. 260 HB, annealed						
Tensile strength $R_m$ (as received condition)	approx. 880 N/mm <sup>2</sup>						
Working hardness	max. 54 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
	11,3	11,9	12,5	12,2	12,0	12,1	12,4
Thermal conductivity $W/(m \cdot K)$	23°C	150°C	300°C	350°C	400°C	500°C	
	31,0	34,0	33,9	34,1	33,2	31,2	

## Technical properties

Steel grade with focus on cold work, high toughness (nickel content), good through-hardenability (even for large cross-sections), as well as high impact strength and pressure resistance. Polishable, etchable and erodible. For very special purity and homogeneousness we recommend AISI/SAE 6F7 ESR.

## Applications

Cutting tools, cutlery punches, embossing tools, bending tools, cold hobbing tools, pressure bars, billet shear knives, cold shear knives, plastic moulds, hot press tools, light metal processing, heavy metal processing, drawing jaws, reinforcements.

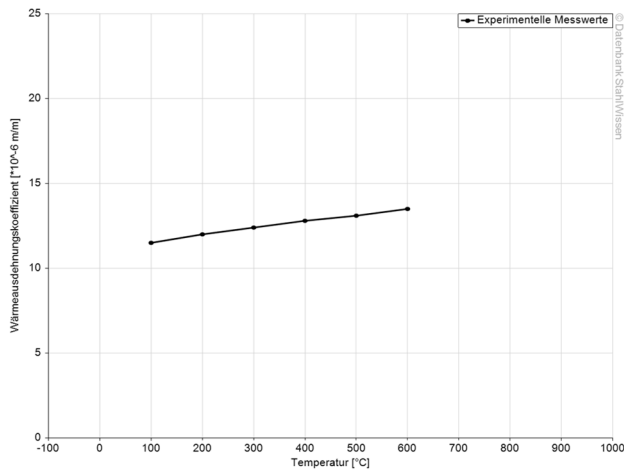
## Heat treatment

	Temperature	Cooling	Hardness			
Soft annealing	610 - 650°C	Furnace	max. 260 HB			
	Temperature	Cooling				
Stress relief annealing	approx. 600 - 650°C	Furnace				
	Temperature	Quenching in	Hardness after quenching			
Hardening	840 - 870°C	Air, oil, hot basin (180 - 220°C)	56 HRC			
	100°C	200°C	300°C	400°C	500°C	600°C
Tempering	56 HRC	54 HRC	50 HRC	46 HRC	42 HRC	38 HRC



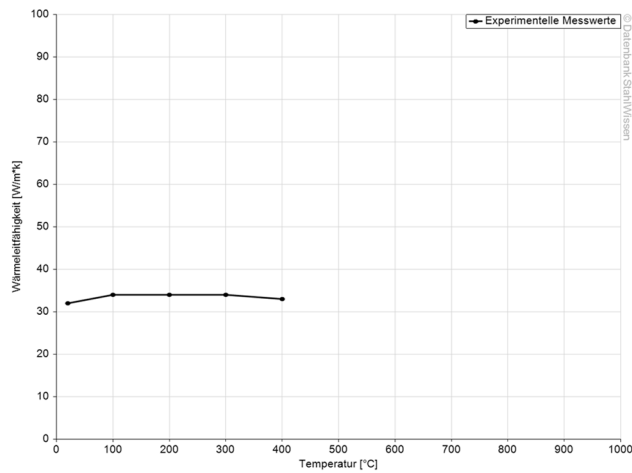
## Thermal expansion coefficient diagram

Werkstoff: 45NiCrMo16, 1.2767



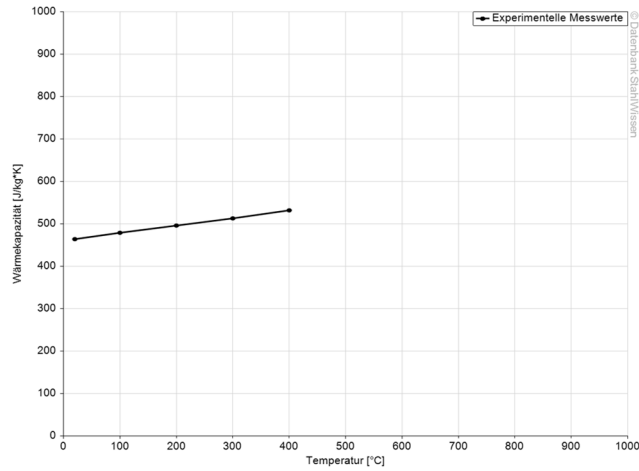
## Thermal conductivity diagram

Werkstoff: 45NiCrMo16, 1.2767



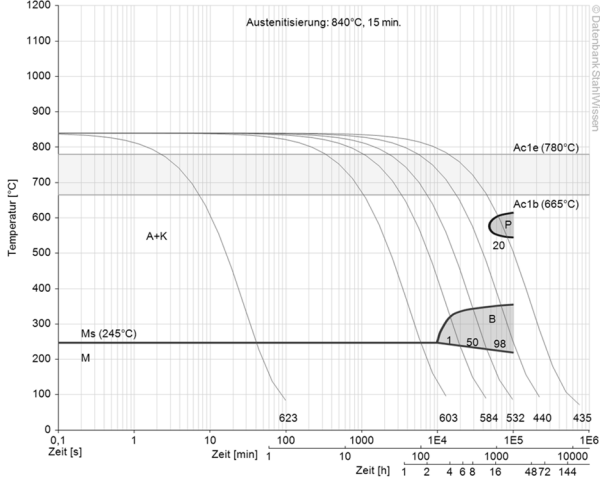
### Thermal capacity diagram

Werkstoff: 45NiCrMo16, 1.2767

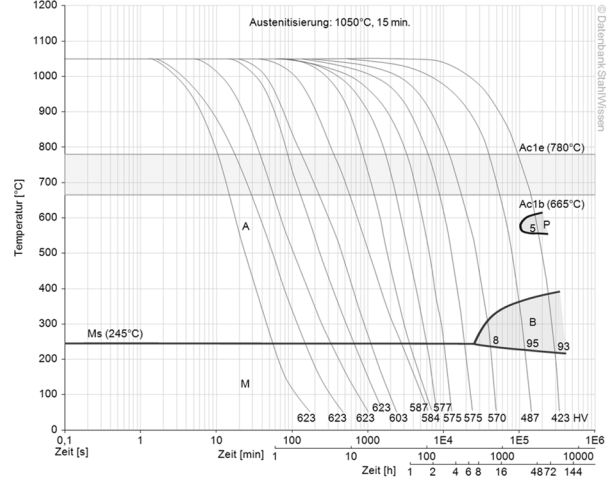


### Continuous ZTU-diagrams

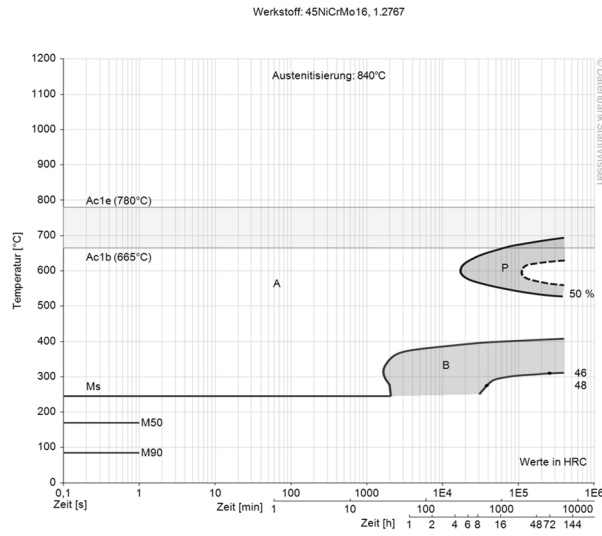
Werkstoff: 45NiCrMo16, 1.2767  
Schmelzanalyse:  
0,45% C; 0,20% Si; 0,40% Mn; 1,30% Cr; 0,30% Mo; 4,00% Ni



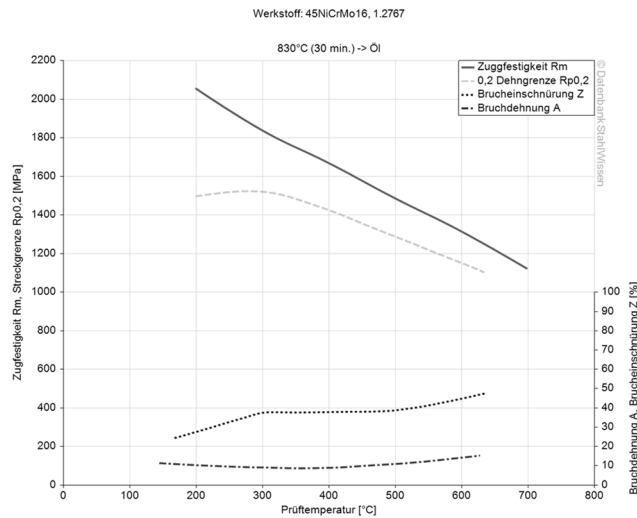
Werkstoff: 45NiCrMo16, 1.2767  
Schmelzanalyse:  
0,42% C; 0,39% Si; 0,38% Mn; 0,017% P; 0,010% S; 1,61% Cr; 0,23% Mo; 4,40% Ni; 0,060% V; 0,018% Al



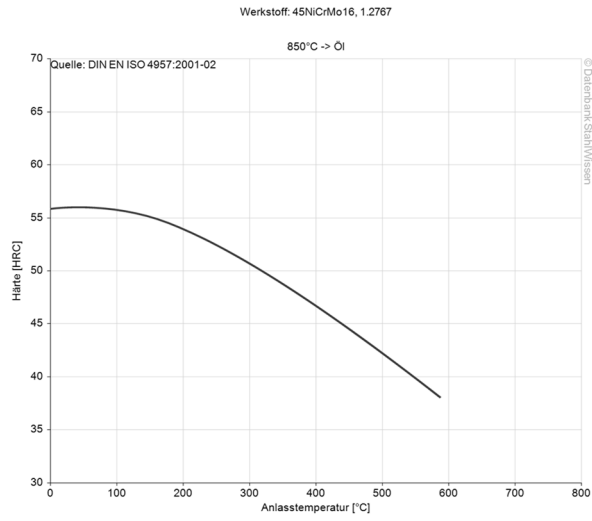
## Isothermal ZTU-diagram



## Hardening and tempering 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

