

## Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.2344 ESU
Description	X40CrMoV5-1
AISI/SAE	H13 ESR; T20813 ESR
Search for alternatives in the ABRAMS STEEL GUIDE®	<a href="http://www.steel-guide.eu/alternatives/H13ESR">www.steel-guide.eu/alternatives/H13ESR</a>

## Specifications



€co-Präz\* [€co]

L: 300 mm

L: 500 mm

## Chemical composition AISI/SAE H13 ESR (reference value %)

C	Si	Mn	P	S	Cr	Mo	V
0,35 - 0,42	0,8 - 1,2	0,25 - 0,5	0 - 0,03	0 - 0,02	4,8 - 5,5	1,2 - 1,5	0,85 - 1,15

## Physical properties

Hardness (delivery condition)	max. 229 HB, annealed						
Tensile strength R <sub>m</sub> (as received condition)	approx. 770 N/mm <sup>2</sup>						
Working hardness	max. 56 HRC						
Thermal expansion coefficient 10 <sup>-6</sup> m/(m • K)	20 - 100°C	20 - 200°C	20 - 300°C	20 - 400°C	20 - 500°C	20 - 600°C	20 - 700°C
	10,9	11,9	12,3	12,7	13,0	13,3	13,5
Thermal conductivity W/(m • K)	20°C	350°C	700°C				
	Annealed	27,2	30,5	33,4			
	Tempered	25,5	27,6	30,3			

## Technical properties

Hot work steel with excellent heat resistance and wear resistance (slightly higher than AISI/SAE H11). Good toughness and thermal conductivity. Can be cooled with water and is resistant to thermal shock. The ESR production (Electro Slag Remelted Steel) guarantees pureness and homogeneousness, as well as improved toughness.

## Applications

Forging tools and dies, hot shear knives, hot extrusion tools, extrusion press tools, press tools, block receivers, die casting tools, light metal die casting, press mandrels, press dies, piecer plugs, screw production, rivet production, bolts production, ejectors, plastic moulds.

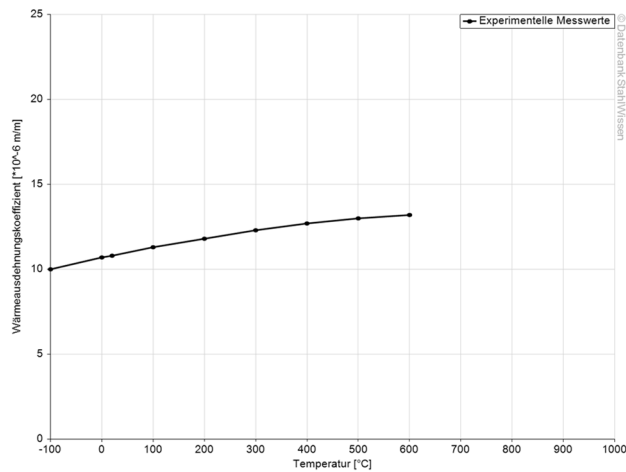


## Heat treatment

	Temperature	Cooling	Hardness						
Soft annealing	750 - 800°C	Furnace	max. 229 HB						
	Temperature	Cooling							
Stress relief annealing	600 - 650 °C	Furnace							
	Temperature	Quenching in	Hardness after quenching						
Hardening	1010 - 1030 °C	Air, oil, hot basin (500 - 550°C)	54 HRC						
	100°C	200°C	300°C	400°C	500°C	550°C	600°C	650°C	700°C
Tempering	53 HRC	52 HRC	52 HRC	54 HRC	56 HRC	54 HRC	50 HRC	42 HRC	32 HRC

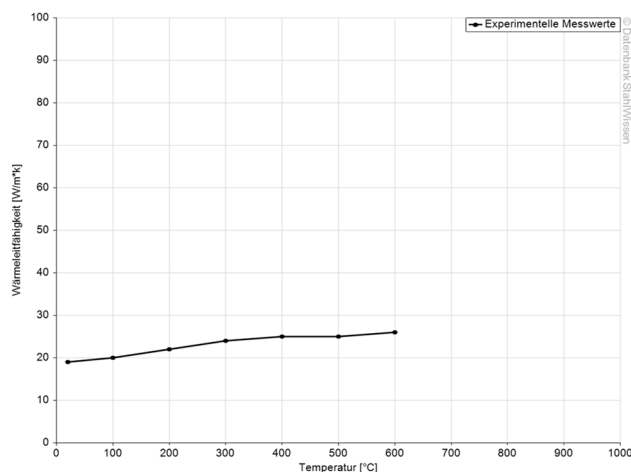
## Thermal expansion coefficient diagram

Werkstoff: X40CrMoV5-1, 1.2344



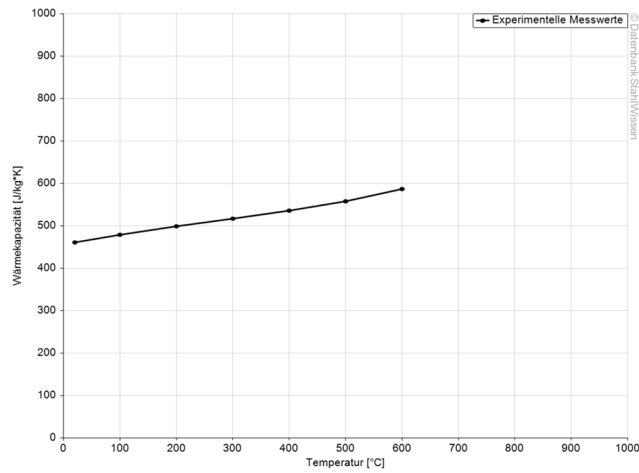
## Thermal conductivity diagram

Werkstoff: X40CrMoV5-1, 1.2344



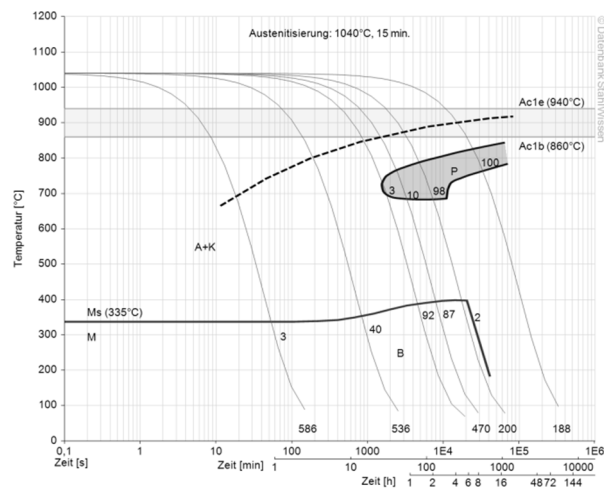
## Thermal capacity diagram

Werkstoff: X40CrMoV5-1, 1.2344

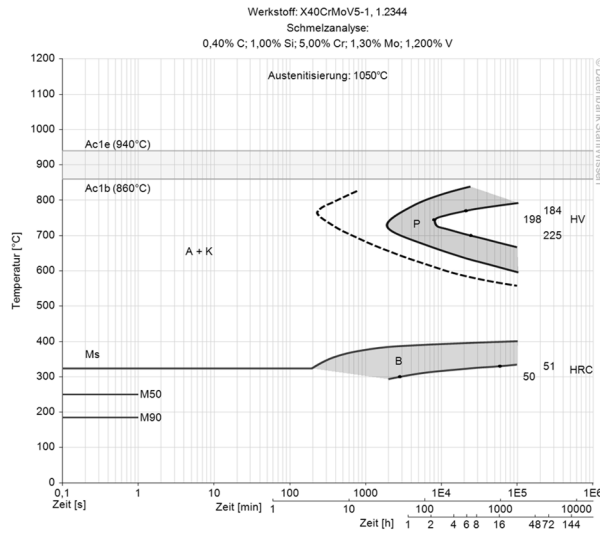


## Continuous ZTU-diagram

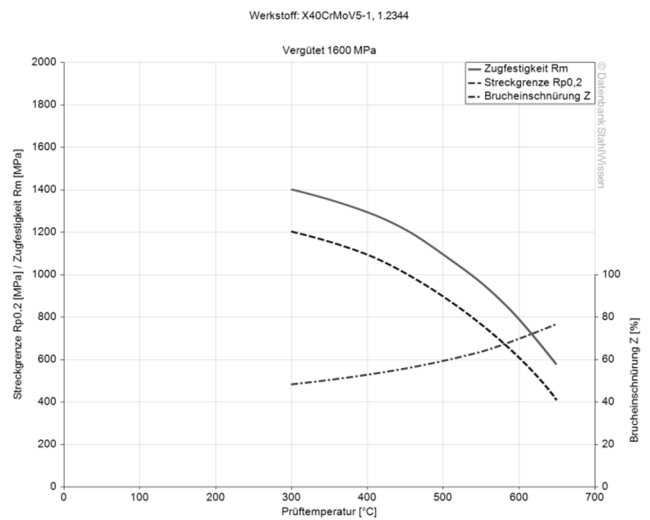
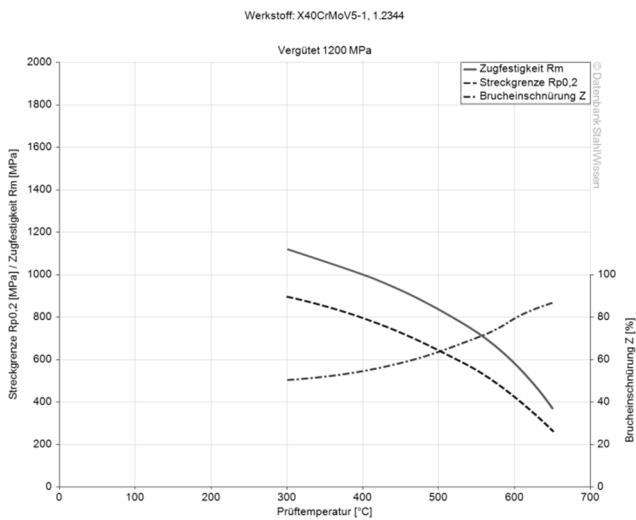
Werkstoff: X40CrMoV5-1, 1.2344



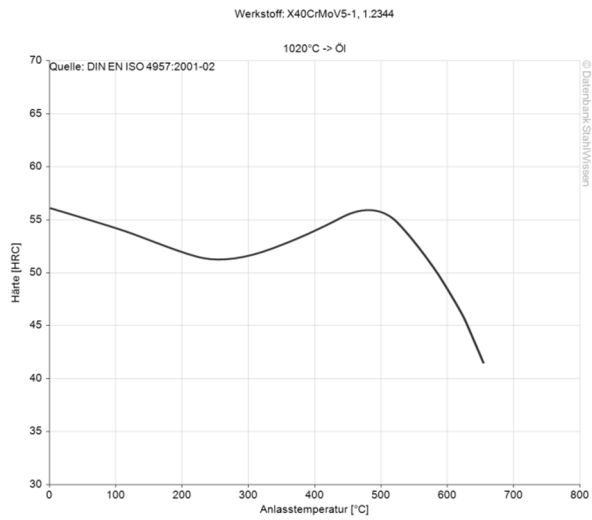
## Isothermal ZTU-diagram



## Hardening and tempering diagrams



## 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

