Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.2344
Description	X40CrMoV5-1
AISI/SAE	H13; T20813
Search for alternatives in the ABRAMS STEEL GUIDE®	**www.steel-guide.eu/alternatives/H13**

Specifications

Precision round steel
with machining allowance [PRS/BA]
peeled / rough-turned
L: 500 mm
L: 1.000 mm

Chemical composition AISI/SAE H13 (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_m (as received condition)	approx. 770 N/mm²						
Working hardness	max. 56 HRC						
Thermal expansion coefficient 10^{-6}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 high wear resistance (slightly higher than AISI/SAE H11). Good toughness and thermal conductivity. Can be cooled with water and is resistant to thermal shock.

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.

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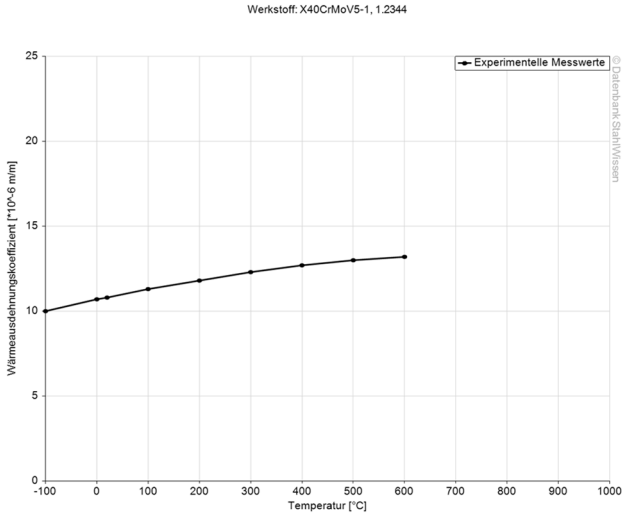
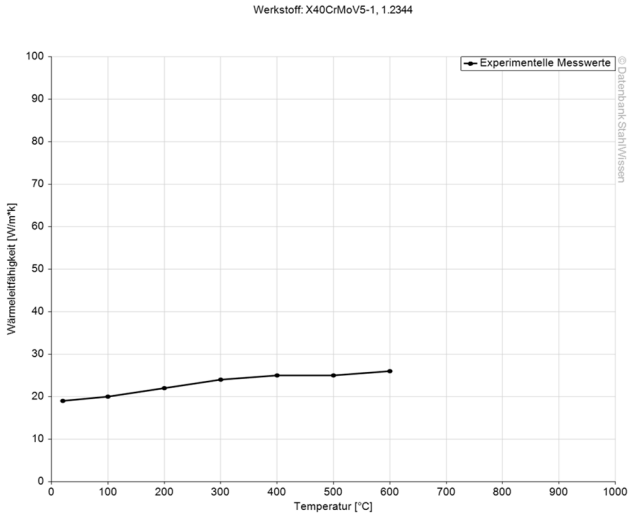
Heat treatment

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

Thermal expansion coefficient diagram



Thermal conductivity diagram



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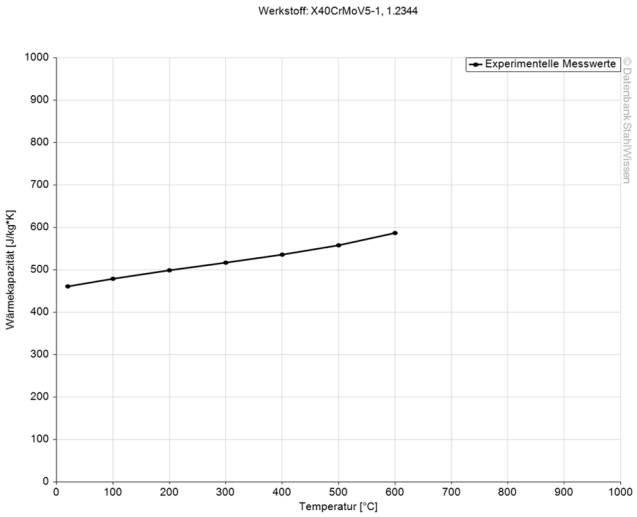
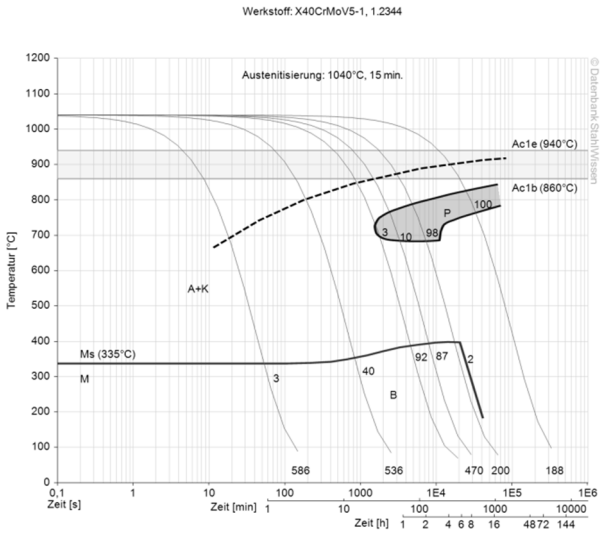
Thermal capacity diagram



Continuous ZTU-diagram



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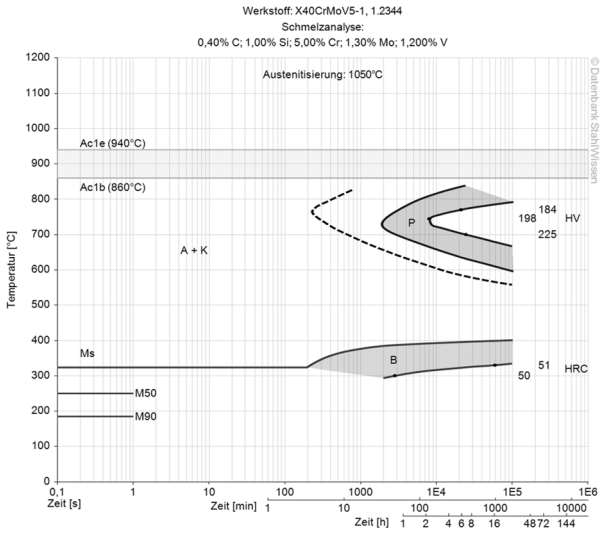
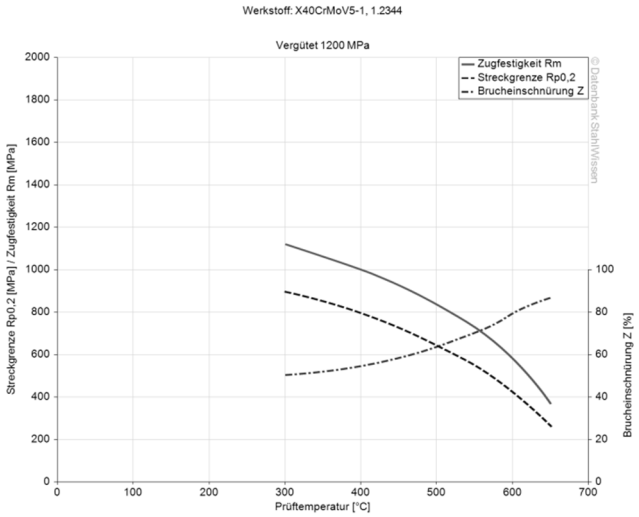
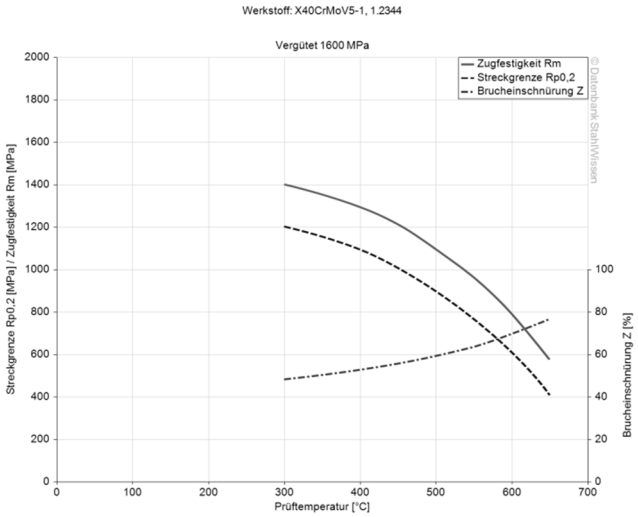
Isothermical ZTU-diagram



Hardening and tempering diagrams





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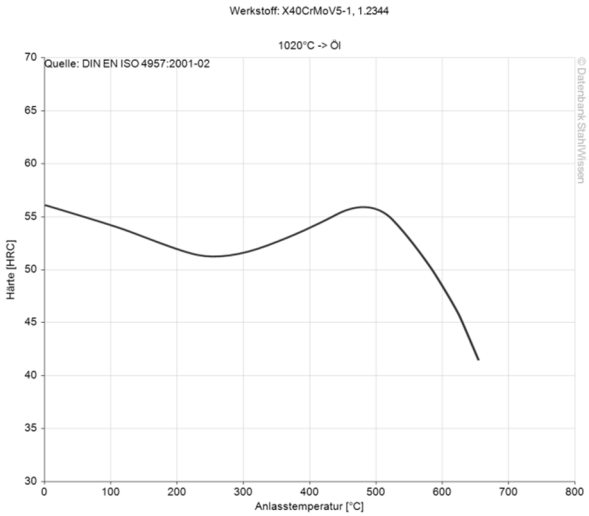
Tempering diagram



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