

Steel grade

Material No.	PREMIUM H13 ESR
AISI	H13 ESR; T20813 ESR
Search for alternatives in the ABRAMS STEEL GUIDE	www.abrams-steelguide.com/alternatives/H13ESR

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 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_m (as received condition)	approx. 111.6 KSI						
Working hardness	max. 56 HRC						
Thermal expansion coefficient $10^{-6}m/(m \cdot K)$	68 - 212°F	68 - 392°F	68 - 572°F	68 - 752°F	68 - 932°F	68 - 1112°F	68 - 1292°F
	10.9	11.9	12.3	12.7	13.0	13.3	13.5
Thermal conductivity $W/(m \cdot K)$	68°F						
	662°F						
	1292°F						
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. 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

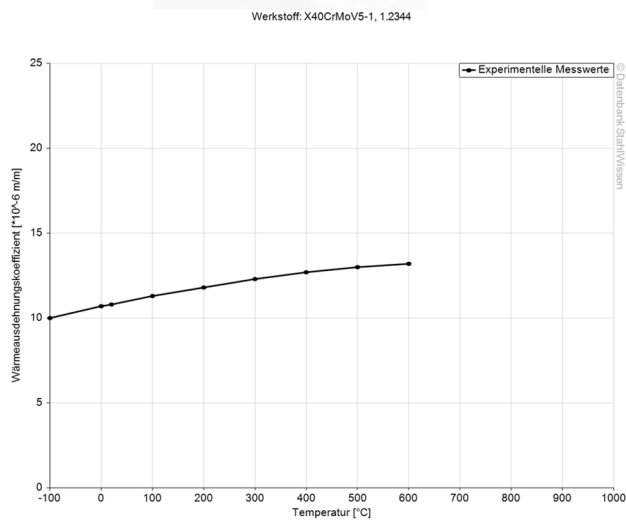
Forging tools and dies, hot shear knives, hot extrusion tools, extrusion press tools, press tools, block receivers, die casting tools, light metal die casting, press mandrels, press dies, piecer plugs, screw production, rivet production, bolts production, ejectors, plastic molds.



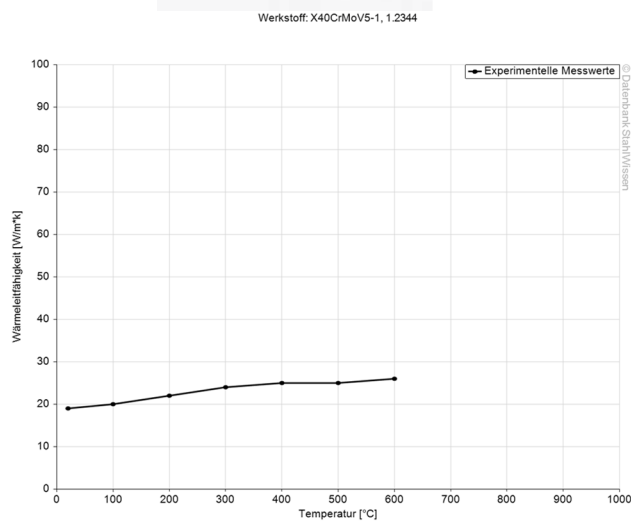
Heat treatment

Soft annealing	Temperature		Cooling		Hardness				
	1382 - 1472°F		Furnace		max. 229 HB				
Stress relief annealing	Temperature		Cooling						
	1112 - 1202°F		Furnace						
Hardening	Temperature		Quenching in			Hardness after quenching			
	1850 - 1886°F		Air, oil, hot basin (932 - 1022°F)			54 HRC			
Tempering	212°F	392°F	572°F	752°F	932°F	1022°F	1112°F	1202°F	1292°F
	53 HRC	52 HRC	52 HRC	54 HRC	56 HRC	54 HRC	50 HRC	42 HRC	32 HRC

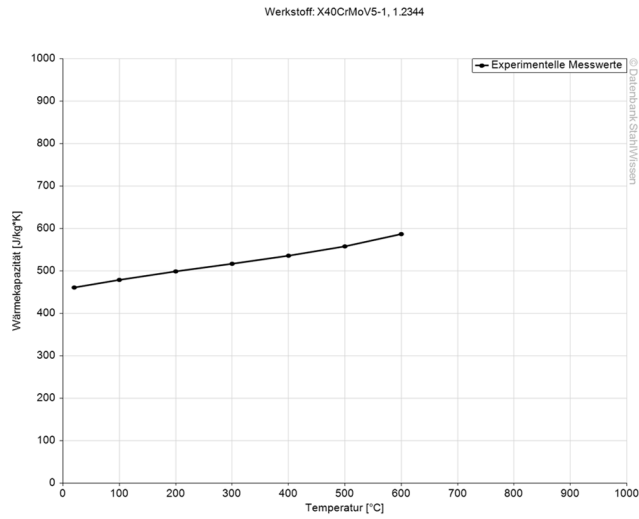
Thermal expansion coefficient diagram



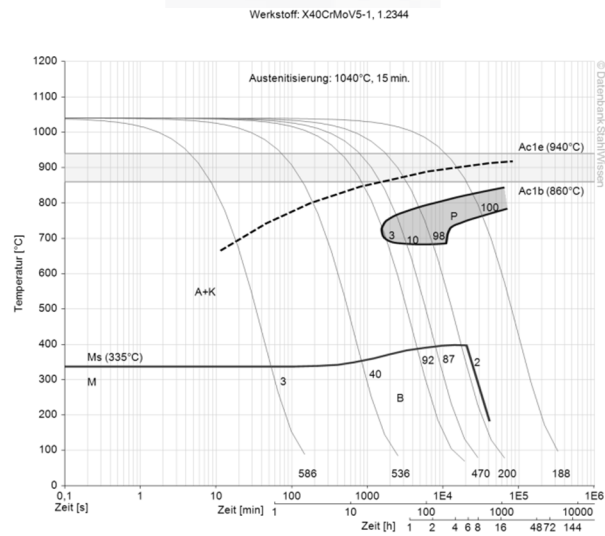
Thermal conductivity diagram



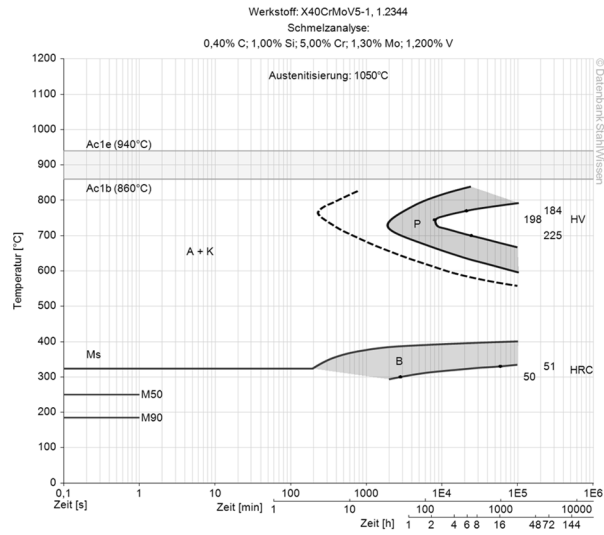
Thermal capacity diagram



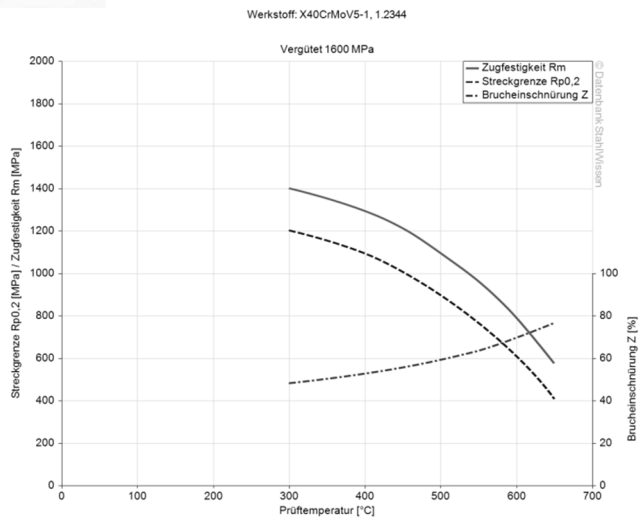
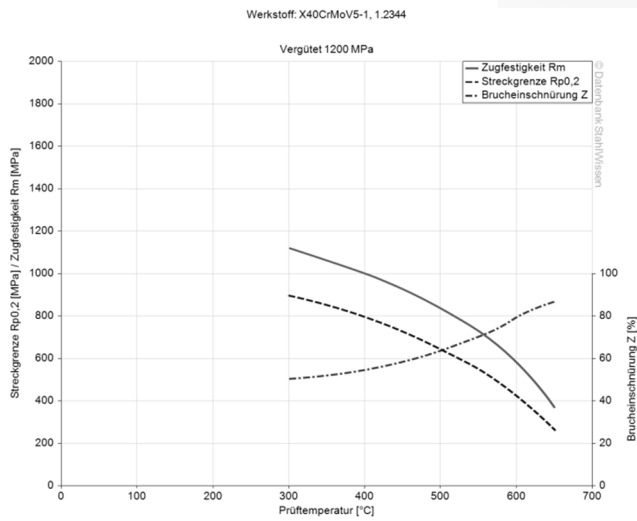
Continuous ZTU-diagram



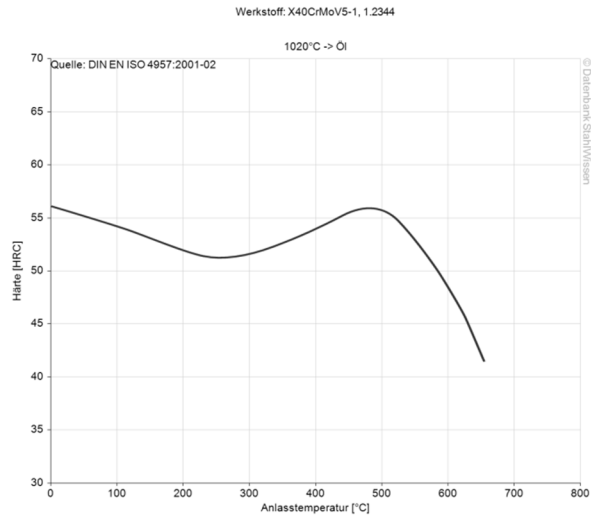
Isothermal ZTU-diagram



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
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