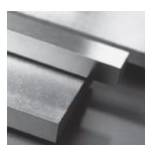


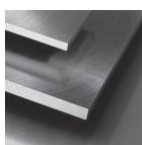
## Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.4031
Description	X39Cr13
BS	420 S 45
AISI/SAE	420
Search for alternatives in the ABRAMS STEEL GUIDE®	<a href="http://www.steel-guide.co.uk/alternatives/420S45">www.steel-guide.co.uk/alternatives/420S45</a>

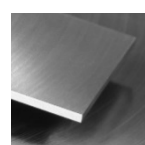
## Specifications



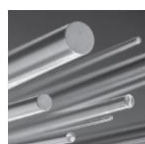
**Precision flat steel with machining allowance [PFS/BA]**  
L: 1.000 mm



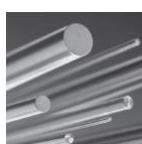
**€co-Präz® [€co]**  
L: 500 mm



**Hart-Präz® [Hart]**  
L: 250 mm  
L: 500 mm



**Precision round steel without machining allowance [PRS]**  
bright ground, ISO h9  
L: 1.000 mm



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

## Chemical composition BS 420 S 45 (reference value %)

C	Si	Mn	P	S	Cr
0,36 - 0,42	0 - 1,0	0 - 1,0	0 - 0,04	0 - 0,015	12,5 - 14,5

## Physical properties

Hardness (delivery condition)	max. 241 HB, annealed			
Tensile strength $R_m$ (as received condition)	approx. 815 N/mm <sup>2</sup>			
Working hardness	max. 55 HRC			
Thermal expansion coefficient $10^{-6}m/(m \cdot K)$	20 - 100°C	20 - 200°C	20 - 300°C	20 - 400°C
	10,5	11,0	11,5	12,0
Thermal conductivity $W/(m \cdot K)$	20°C			
	30,0			

## Technical properties

Martensitic chromium steel with good mechanical properties. Excellent polishing properties, good corrosion resistance, good chemical resistance and difficult to weld. Due to it's high contents of carbon excellent to use for cutting tools. The material is conditionally acid resistant.

## Applications

Mechanical engineering, medical technology, machine knives, shears, cutting tools, razors, automotive industry, food technology, fasteners, decoration purposes, kitchen equipment, power engineering, springs, piston rods, screws.

### ABRAMS PREMIUM STEEL

is a registered trademark of  
Abrams Engineering Services GmbH & Co. KG  
Hannoversche Str. 38 · 49084 Osnabrueck / Germany  
Managing Director: Dipl.-Wi.-Ing. Dr. Juergen Abrams

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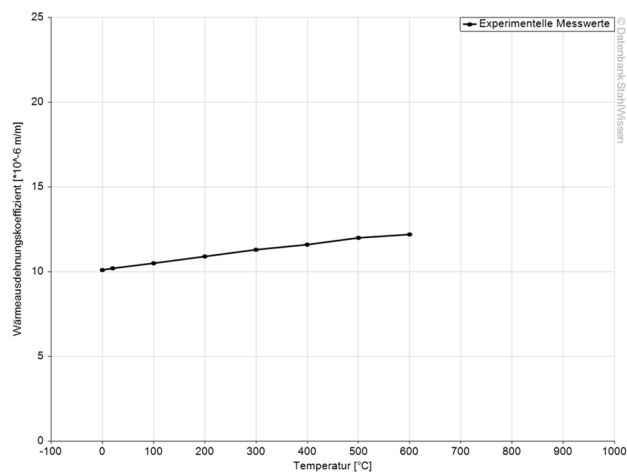
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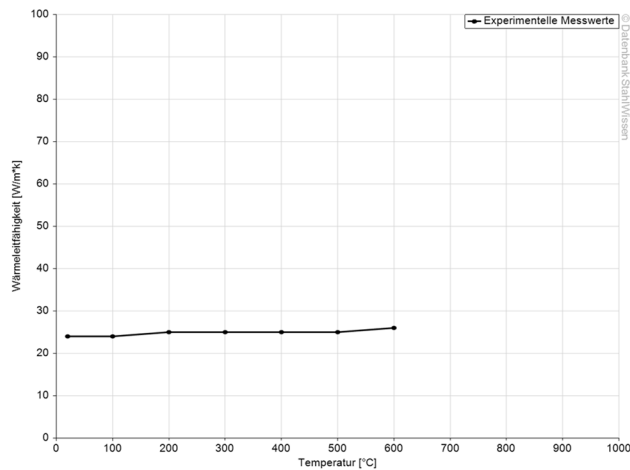
## Heat treatment

	Temperature	Cooling	Hardness
Soft annealing	760 - 800°C	Furnace, air	max. 241 HB
Stress relief annealing	600 - 650°C	Furnace	
Hardening	1000 - 1050°C	Quenching in Air, oil, basin (500 - 550°C)	

## Thermal expansion coefficient diagram



## Thermal conductivity diagram



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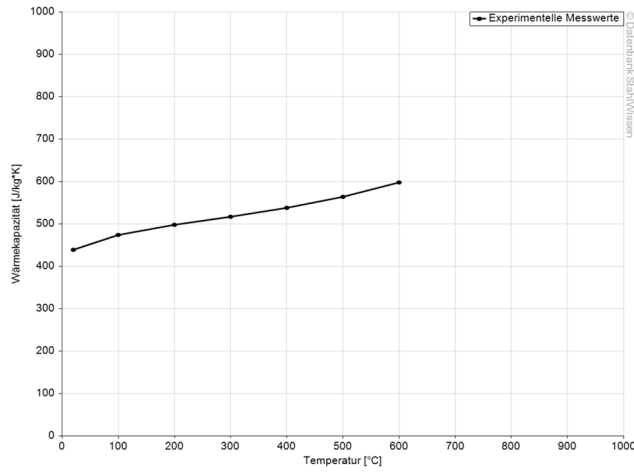
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## Thermal capacity diagram



## Tempering diagrams

