

## Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.2709 ESU
Description	X3NiCoMoTi18-9-5
BS	1.2709 ESR
AISI/SAE	1.2709 ESR
Search for alternatives in the ABRAMS STEEL GUIDE®	<a href="http://www.steel-guide.co.uk/alternatives/1.2709ESR">www.steel-guide.co.uk/alternatives/1.2709ESR</a>

## Specifications



**Precision round steel with machining allowance [PRS/BA]**  
peeled / rough-turned  
L: 500 mm  
L: 1,000 mm



**Round steel [RS]**  
black  
L: 500 mm  
L: 1,000 mm

## Chemical composition BS 1.2709 ESR (reference value %)

C	Si	Mn	P	S	Cr	Mo	Ni	Ti	Co
0 – 0.03	0 – 0.1	0 – 0.15	0 – 0.01	0 – 0.1	0 – 0.25	4.5 – 5.2	17.0 – 19.0	0.8 – 1.2	8.5 – 10.0

## Physical properties

Hardness (delivery condition)	max. 325 HB, tempered							
Tensile strength $R_m$ (as received condition)	approx. 1100 N/mm <sup>2</sup>							
Working hardness	max. 56 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	
	10.1	10.5	10.9	11.1	11.3	11.5	11.8	
Thermal conductivity $W/(m \cdot K)$	23°C	150°C	300°C	350°C	400°C	500°C		
	18.4	20.4	22.7	23.2	23.5	24.0		

## Technical properties

Ultra-high strength tool steel with excellent toughness, high yield point and high tensile strength. Easy heat treatment at low temperatures. Good dimensional stability and low distortion. Good machinability when hardened.

## Applications

Slides, gearing stamps, cold heading tools, embossing tools, press dies, hot press mould and tools, tool holders, cutting punches, die casting moulds (for light metal alloys), plastic moulds, reinforcements, light metal processing, shear knives, nozzles, distributor pins, cores.



## Heat treatment

	Temperature	Cooling	Hardness
Soft annealing	850 - 1100°C	Furnace	max. 325 HB
Hardening	Temperature	Quenching in	
	approx. 490°C	Air	

## Tempering diagram

