

# HOT WORK TOOL STEELS

Application Segm	ents	
Hot Work		
Available Product	Variants	
Long Products		
Product Description	on	
steels, the material ger secondary hardening c VMR corresponds to m	s not a classic hot work tool steel, but an ultra-high strengt perates its high strength not through a hardened and tempe parbides, but through the precipitation of intermetallic phase aterial number 1.2709 (X3NiCoMoTi18-9-5) and has prove °C. The Steel also is available as powder material for met	ered martensitic structure with a high carbon content and es from a tough nickel martensitic matrix. BÖHLER W722 en to be ideally suited for many tool steel applications in co
Process Melting		
VIM + VAR		
Applications		
<ul><li>Extrusion</li><li>Injection Molding</li></ul>	<ul> <li>Fasteners, Bolts, Nuts</li> <li>General Components for Mechanical Engineering</li> </ul>	<ul><li>&gt; High Pressure Die-Casting</li><li>&gt; Tool Holders (milling, drilling, turning &amp; chucks)</li></ul>
Technical data		
Material designation	1.2709 SEL	

## Chemical composition (wt. %)

С	Si	Mn	Мо	Ni	Со	Ti
≤ 0,03	≤ 0,10	≤ 0,15	4.90	18.00	9.30	1.10

## **Delivery condition**

Solution annealed	
Hardness (HB)	max. 353

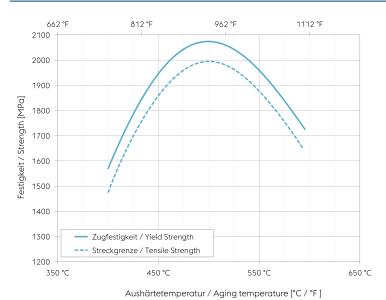




#### Heat treatment

Solution annealing			
Temperature	820 °C	1 hour air, gas	
Precipitation hardening			
Temperature	490 °C	6 hours air	

## Ageing chart



#### Aging:

Solution annealed 820°C (1508°F) / 1 hour / air Aging time: 3 hours

For maximum hardness there is also the possibility to age 6 hours at 490°C (914°F).

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## **Physical Properties**

Temperature (°C)	20
Density (kg/dm³)	8.1
Thermal conductivity (W/(m.K))	21
Specific heat (kJ/kg K)	0.42
Spec. electrical resistance (Ohm.mm²/m)	0.42
Modulus of elasticity (10 <sup>3</sup> N/mm <sup>2</sup> )	200

# Thermal Expansions between 20°C | 68°F and ...

Temperature (°C)		200	300	400	500
Thermal expansion (10 <sup>-6</sup> m/(m.K))	10.3	10.7	11	11.3	11.6





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If other available product variants are listed in addition to long products, please note that these may differ in terms of melting process, technical data, delivery and surface condition as well as available product dimensions. For mandatory technical specifications, other requirements and dimensions, please contact our regional voestalpine BÖHLER sales companies. The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. Measurement data are laboratory values and can deviate from practical analyses. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.

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