

## Bohler-Uddeholm BÖHLER W303 ISODISC® Hot Work Tool Steel

Category : Metal , Ferrous Metal , Tool Steel , Hot Work Steel

### Material Notes:

Description: Hot work tool steel featuring excellent hot tensile properties, high retention of hardness, good toughness and resistance to heat checking, admits water cooling. BOHLER W303 is also available in the special grades ISODISC and ISOBLOC with improved homogeneity and increased toughness. Applications: Heavy duty hot work tools and dies, mainly for light alloy processing: mandrels, dies and containers for metal tube and rod extrusion; hot extrusion equipment; tools and dies for the manufacture of hollow bodies, screws, rivets, nuts and bolts. Die casting equipment, forming dies, die inserts, hot shear blades, and plastic molding dies.

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[http://www.lookpolymers.com/polymer\\_Bohler-Uddeholm-BHLER-W303-ISODISC-Hot-Work-Tool-Steel.php](http://www.lookpolymers.com/polymer_Bohler-Uddeholm-BHLER-W303-ISODISC-Hot-Work-Tool-Steel.php)

Physical Properties	Metric	English	Comments
Density	7.65 g/cc	0.276 lb/in <sup>3</sup>	
	@Temperature 600 °C	@Temperature 1110 °F	
	7.69 g/cc	0.278 lb/in <sup>3</sup>	
	@Temperature 500 °C	@Temperature 932 °F	
	7.85 g/cc	0.284 lb/in <sup>3</sup>	
	@Temperature 20.0 °C	@Temperature 68.0 °F	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	1100 - 1380 MPa	160000 - 200000 psi	varies with heat treatment
	@Temperature 315 °C	@Temperature 599 °F	
	1200 - 1590 MPa	174000 - 231000 psi	varies with heat treatment
	@Temperature 20.0 °C	@Temperature 68.0 °F	
Tensile Strength, Yield	900 - 1170 MPa	131000 - 170000 psi	
	@Strain 0.200 %, Temperature 315 °C	@Strain 0.200 %, Temperature 599 °F	
	1000 - 1380 MPa	145000 - 200000 psi	
	@Strain 0.200 %, Temperature 20.0 °C	@Strain 0.200 %, Temperature 68.0 °F	
Reduction of Area	50 %	50 %	
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	50 %	50 %	
	@Temperature 315 °C	@Temperature 599 °F	
	165 GPa	23900 ksi	

Modulus of Elasticity Mechanical Properties	Metric @ Temperature 600 °C	English @ Temperature 1110 °F	Comments
	176 GPa	25500 ksi	
	@Temperature 500 °C	@Temperature 932 °F	
	215 GPa	31200 ksi	
	@Temperature 20.0 °C	@Temperature 68.0 °F	

Thermal Properties	Metric	English	Comments
CTE, linear	11.5 $\mu\text{m}/\text{m}\cdot\text{°C}$	6.39 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 100 °C	@Temperature 212 °F	
	12.0 $\mu\text{m}/\text{m}\cdot\text{°C}$	6.67 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 200 °C	@Temperature 392 °F	
	12.2 $\mu\text{m}/\text{m}\cdot\text{°C}$	6.78 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 300 °C	@Temperature 572 °F	
	12.5 $\mu\text{m}/\text{m}\cdot\text{°C}$	6.94 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 400 °C	@Temperature 752 °F	
	12.9 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.17 $\mu\text{in}/\text{in}\cdot\text{°F}$	
@Temperature 500 °C	@Temperature 932 °F		
Specific Heat Capacity	13.0 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.22 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 600 °C	@Temperature 1110 °F	
	13.2 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.33 $\mu\text{in}/\text{in}\cdot\text{°F}$	
@Temperature 700 °C	@Temperature 1290 °F		
Specific Heat Capacity	0.460 J/g-°C	0.110 BTU/lb-°F	
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	0.548 J/g-°C	0.131 BTU/lb-°F	
@Temperature 500 °C	@Temperature 932 °F		
Specific Heat Capacity	0.590 J/g-°C	0.141 BTU/lb-°F	
	@Temperature 600 °C	@Temperature 1110 °F	
	Thermal Conductivity	28.8 W/m-K	200 BTU-in/hr-ft <sup>2</sup> -°F
@Temperature 700 °C		@Temperature 1290 °F	
Thermal Conductivity	29.0 W/m-K	201 BTU-in/hr-ft <sup>2</sup> -°F	Hardened and tempered
	@Temperature 100 °C	@Temperature 212 °F	

Thermal Properties	Metric	English	Comments
	29.2 W/m-K @Temperature 600 °C	203 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 1110 °F	Hardened and tempered
	30.4 W/m-K @Temperature 500 °C	211 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 932 °F	Hardened and tempered
	30.4 W/m-K @Temperature 200 °C	211 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 392 °F	Hardened and tempered
	31.1 W/m-K @Temperature 300 °C	216 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 572 °F	Hardened and tempered
	31.1 W/m-K @Temperature 400 °C	216 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 752 °F	Hardened and tempered

Component Elements Properties	Metric	English	Comments
Carbon, C	0.38 %	0.38 %	
Chromium, Cr	5.0 %	5.0 %	
Iron, Fe	90.47 %	90.47 %	As remainder
Manganese, Mn	0.40 %	0.40 %	
Molybdenum, Mo	2.8 %	2.8 %	
Silicon, Si	0.40 %	0.40 %	
Vanadium, V	0.55 %	0.55 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000500 ohm-cm @Temperature 20.0 °C	0.0000500 ohm-cm @Temperature 68.0 °F	
	0.0000590 ohm-cm @Temperature 600 °C	0.0000590 ohm-cm @Temperature 1110 °F	
	0.0000840 ohm-cm @Temperature 500 °C	0.0000840 ohm-cm @Temperature 932 °F	

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