

Bohler-Uddeholm BÖHLER W403 VMR® Hot Work Tool Steel

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

Material Notes:

W403 VMR is a modified hot work alloy with an excellent combination of hot tensile properties and toughness. The balanced properties of this grade are not only due to chemistry modification, but to optimized production techniques including the use of Vacuum Arc Remelting, and improved diffusion annealing and structural treatments. These changes have led to a high degree of cleanliness, of uniformity of cleanliness, toughness and dimensional stability. Use this grade where an improved version of W303 is required. Applications include highly stressed hot work tools, such as mandrels, dies and containers for metal tube and rod extrusion; hot extrusion tools; tools for the manufacture of hollows: tools for the manufacture of screws, nuts, rivets and bolts; forging dies and punches; die casting dies; forming dies; or hot shear blades.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Bohler-Uddeholm-BHLER-W403VMR-Hot-Work-Tool-Steel.php

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

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	<= 205	<= 205	as delivered
Hardness, Rockwell C	55	55	hardened 1025°C then tempered 500°C
Modulus of Elasticity	165 GPa	23900 ksi	
	@Temperature 600 °C	@Temperature 1110 °F	
	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 µm/m-°C	6.39 µin/in-°F	
	@Temperature 20.0 -	@Temperature 68.0 -	

Thermal Properties	100 °C Metric	212 °F English	Comments
	12.0 μm/m-°C	6.67 μin/in-°F	
	@Temperature 20.0 - 200 °C	@Temperature 68.0 - 392 °F	
	12.2 μm/m-°C	6.78 μin/in-°F	
	@Temperature 20.0 - 300 °C	@Temperature 68.0 - 572 °F	
	12.5 μm/m-°C	6.94 μin/in-°F	
	@Temperature 20.0 - 400 °C	@Temperature 68.0 - 752 °F	
	12.9 μm/m-°C	7.17 μin/in-°F	
	@Temperature 20.0 - 500 °C	@Temperature 68.0 - 932 °F	
	13.0 μm/m-°C	7.22 μin/in-°F	
	@Temperature 20.0 - 600 °C	@Temperature 68.0 - 1110 °F	
	13.2 μm/m-°C	7.33 μin/in-°F	
	@Temperature 20.0 - 700 °C	@Temperature 68.0 - 1290 °F	
Specific Heat Capacity	0.460 J/g-°C	0.110 BTU/lb-°F	
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	0.550 J/g-°C	0.131 BTU/lb-°F	
	@Temperature 500 °C	@Temperature 932 °F	
	0.590 J/g-°C	0.141 BTU/lb-°F	
	@Temperature 600 °C	@Temperature 1110 °F	
Thermal Conductivity	28.4 W/m-K	197 BTU-in/hr-ft ² -°F	
	@Temperature 100 °C	@Temperature 212 °F	
	29.7 W/m-K	206 BTU-in/hr-ft ² -°F	
	@Temperature 200 °C	@Temperature 392 °F	
	29.7 W/m-K	206 BTU-in/hr-ft ² -°F	
	@Temperature 600 °C	@Temperature 1110 °F	
	30.0 W/m-K	208 BTU-in/hr-ft ² -°F	
	@Temperature 700 °C	@Temperature 1290 °F	
	30.0 W/m-K	208 BTU-in/hr-ft ² -°F	

Thermal Properties	Metric	English	Comments
	@Temperature 500 °C	@Temperature 932 °F	
	30.1 W/m-K	209 BTU-in/hr-ft ² -°F	
	@Temperature 400 °C	@Temperature 752 °F	
	30.2 W/m-K	210 BTU-in/hr-ft ² -°F	
	@Temperature 300 °C	@Temperature 572 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.38 %	0.38 %	
Chromium, Cr	5.0 %	5.0 %	
Iron, Fe	90.7 %	90.7 %	As Balance
Manganese, Mn	0.25 %	0.25 %	
Molybdenum, Mo	2.8 %	2.8 %	
Silicon, Si	0.20 %	0.20 %	
Vanadium, V	0.65 %	0.65 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000500 ohm-cm	0.0000500 ohm-cm	
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	0.0000860 ohm-cm	0.0000860 ohm-cm	
	@Temperature 500 °C	@Temperature 932 °F	
	0.0000960 ohm-cm	0.0000960 ohm-cm	
	@Temperature 600 °C	@Temperature 1110 °F	

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