

Bohler-Uddeholm UDDEHOLM VANADIS 30 AISI M2 + Co SUPERCLEAN 3 Powder Metallurgical Cold Work Tool Steel

Category : Metal , Ferrous Metal , Alloy Steel , Tool Steel , Cold Work Steel

Material Notes:

Uddeholm Vanadis 30 is a Co high alloyed powder metallurgy high speed steel corresponding to AISI M3:2 + Co. The high compressive strength, 67 HRC, and good abrasive wear resistance makes Uddeholm Vanadis 30 suitable for demanding cold work applications and for cutting tools as an alternative to AISI M42 or other Co-alloyed HSS. The P/M process gives a good machinability and grindability as well as a good dimension stability during heat treatment. Vanadis 30 is characterized by: High wear resistance High compressive strength at high hardness Good through hardening properties Good toughness Good dimensional stability on heat treatment Good machinability and grindability Very good temper resistance Uddeholm Vanadis 30 is a cobalt alloyed high performance PM high speed steel. The cobalt addition of approx. 8,5% has a positive influence on the hot strength/hot hardness, temper resistance and modulus of elasticity. The presence of cobalt has little influence on wear resistance. As cobalt does not form carbides, the wear resistance of Uddeholm Vanadis 30 is more or less the same as for steels with the same base analysis but without cobalt (e.g. Uddeholm Vanadis 23). On the other hand, its presence reduces the toughness and hardenability somewhat but increases compressive strength and high temperature properties. For cold work: The combination of high wear resistance and unusually good compressive strength can be put to use in tooling for heavy forming operations. In some cold work operations, the active surface (e.g. cutting edge or forming surface) of a tool can reach temperatures in excess of 200°C (390°F). Such conditions can be found in tooling running on high speed presses. Also, development of high temperatures in the tooling can be expected in heavy forming operations.

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http://www.lookpolymers.com/polymer_Bohler-Uddeholm-UDDEHOLM-VANADIS-30-AISI-M2-Co-SUPERCLEAN-3-Powder-Metallurgical-Cold-Work-Tool-Steel.php

Physical Properties	Metric	English	Comments
Density	7.94 g/cc	0.287 lb/in ³	soft annealed
	7.86 g/cc	0.284 lb/in ³	soft annealed
	@Temperature 600.0 °C	@Temperature 1112 °F	
	7.89 g/cc	0.285 lb/in ³	soft annealed
	@Temperature 399 °C	@Temperature 750 °F	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	<= 300	<= 300	Soft annealed
	<= 320	<= 320	Drawn
Hardness, Rockwell C	60 - 67	60 - 67	austenitizing 1832-2156°F, temper 3 x 1hr at 1040°F
Modulus of Elasticity	234 GPa	34000 ksi	(hardened and tempered)
	193 GPa	28000 ksi	hardened and tempered

Mechanical Properties	@Temperature 600.0 °C Metric	@Temperature 1112 °F English	Comments
	214 GPa	31000 ksi	hardened and tempered
	@Temperature 399 °C	@Temperature 750 °F	

Thermal Properties	Metric	English	Comments
CTE, linear	11.7 $\mu\text{m}/\text{m}\cdot\text{°C}$	6.50 $\mu\text{in}/\text{in}\cdot\text{°F}$	hardened and tempered
	@Temperature 399 °C	@Temperature 750 °F	
	12.2 $\mu\text{m}/\text{m}\cdot\text{°C}$	6.80 $\mu\text{in}/\text{in}\cdot\text{°F}$	hardened and tempered
	@Temperature 600.0 °C	@Temperature 1112 °F	
Specific Heat Capacity	0.418 J/g-°C	0.100 BTU/lb-°F	hardened and tempered
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	0.502 J/g-°C	0.120 BTU/lb-°F	hardened and tempered
	@Temperature 399 °C	@Temperature 750 °F	
	0.586 J/g-°C	0.140 BTU/lb-°F	hardened and tempered
	@Temperature 600.0 °C	@Temperature 1112 °F	
Thermal Conductivity	22.0 W/m-K	153 BTU-in/hr-ft ² -°F	hardened and tempered
	@Temperature 20.0 °C	@Temperature 68.0 °F	
	25.0 W/m-K	174 BTU-in/hr-ft ² -°F	hardened and tempered
	@Temperature 600.0 °C	@Temperature 1112 °F	
	26.0 W/m-K	180 BTU-in/hr-ft ² -°F	hardened and tempered
	@Temperature 399 °C	@Temperature 750 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	1.28 %	1.28 %	
Chromium, Cr	4.2 %	4.2 %	
Cobalt, Co	8.5 %	8.5 %	
Iron, Fe	71.5 %	71.5 %	As Balance
Molybdenum, Mo	5.0 %	5.0 %	
Tungsten, W	6.4 %	6.4 %	
Vanadium, V	3.1 %	3.1 %	

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