

VANADIS[®] 10

SUPERCLEAN

Powder Metallurgy Tool Steels

Heat Treatment Recommendations

General Applications

	Vacuum	Salt Bath/Fluidized Bed	Atmosphere Furnace Muffle Furnace/Packed											
Preheating Temperature	1. Bring up to 1200°F, equalize 2. Heat up to 1550°F, equalize (optional)	1. 1100-1200°F, equalize 2. 1500-1600°F, equalize	1. Bring up to 1200°F, equalize 2. Heat up to 1550°F, equalize											
Hardening Temperature Austenitizing	1870-2010°F (Normally 1870°F) Holding time after the tool or part has fully heated through at the hardening temperature: minimum 30 minutes, maximum 1 hour. Alternatively hold 20 minutes for first 1" and then 15 minutes for each additional inch of wall thickness.													
Quenching	Alt. 1 Inert gas, positive pressure Alt. 2 Back-filled pressurized gas to 1050°F, then equalize center and surface. Continue to 600°F and equalize. Then cool in circulating air.	Alt. 1 Quench in salt 390-930°F. Alt. 2 Forced air circulation.	Alt. 1 Circulated inert gas. Alt. 2 Circulated air.											
Tempering (minimum two times) Temper immediately after quenching when the tool or part reaches 150°F	<table border="1"> <thead> <tr> <th rowspan="2">Temperature</th> <th colspan="2">Hardening Temperature:</th> </tr> <tr> <th>1870°F</th> <th>2010°F</th> </tr> </thead> <tbody> <tr> <td>480°F</td> <td>61-63 HRC</td> <td>-</td> </tr> <tr> <td>980°F</td> <td>60-62 HRC</td> <td>63-65 HRC</td> </tr> </tbody> </table> <p>Time: 1 hour per inch of wall thickness, or hold at temperature a minimum of 2 hours.</p>			Temperature	Hardening Temperature:		1870°F	2010°F	480°F	61-63 HRC	-	980°F	60-62 HRC	63-65 HRC
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Average size change as a result of hardening and tempering should not exceed 0.3% overall (0.0015 inches per inch side) if the tool has been stress relieved before finish machining.														

IMPORTANT
Quench as quickly as possible*

* Cooling rate must be adequate to avoid any transformation, with decreased properties as a result. However, also consider the risk of excessive distortion from very fast cooling. (See reverse for specific quenching guidelines)

VANADIS[®] SUPERCLEAN...the new generation of P/M tool steels

- Isotropic mechanical properties - greater reliability in production
- Increased toughness - less down time
- Higher wear resistance - longer tool life

This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as a warranty of specific properties of the products described or a warranty for fitness for a particular purpose.



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