Uddeholm Vancron®

SuperClean Powder Metallurgical Tool Steel

	Vacuum	Salt Bath** / Fluidized Bed	Atmosphere Furnace Muffle Furnace / Packed
	** Salt Bath heat treatment can be performed but is not recommended for details with blind holes or threaded holes that will not be rework after heat treatment.		
Preheating Temperature	1. Bring up to 1200°F, equalize 2. Heat up to 1550°F, equalize	1. 1100 – 1200°F, equalize 2. 1500 – 1550°F, equalize	1. Bring up to 1200°F, equalize 2. Heat up to 1550°F, equalize
Hardening Temperature (Austenitizing)	1740 – 2100°F (Normally 1975°F) Holding time after the tool or part has fully heated through at the hardening temperature: 30 minutes for temperature below 2000°F, 15 minutes for temperatures above 2000°F. Alternatively hold 20 minutes for first 1" and then 15 minutes for each additional inch of wall thickness. To avoid loss of nitrogen at the surface, which may lower the surface hardness, a minimum of 10 mbar and up to 400 mbar nitrogen overpressure is recommended during hardening or wrap in stainless foil. Alternatively the machining allowance could be increased.		
Quenching *	Vacuum furnace with high speed gas at sufficient overpressure 2 minimum	**Alt. 1** Quench in Salt 1020°F **Alt. 2** Circulated high speed inert gas	**Alt. 1** Circulated inert gas **Alt. 2** Circulated air
	*Cooling rate must be adequate to avoid any transformation products, with decreased properties as a result. However, also consider the risk of excessive distortion from very fast cooling. *For maximum dimensional stability, a cryogenic treatment can be applied immediately after quench. An increase in hardness may occur. However, avoid intricate shapes due to risk of cracking. A cryogenic treatment is recommended when hardening at 2000°F or more.		

Tempering

(minimum three times)

Temper immediately after quenching when the complete tool reaches 150°F

Tempering Temperatures	Hardening Temperatures and Hardness			
	1830°F	1875°F	1975°F	2100°F
1000°F	58-60 HRC	60-62 HRC	62-64 HRC	64-66 HRC

Tempering Times:
Temper a minimum of three times, 1 hour each temper. Check hardness between tempers. Use four tempers when maximum dimensional stability is critical.

Stress Temper performed on hardened tools after EDM.	Check hardness to confirm tool status. Temperature: Shall be 50°F below the lowest tempering temperature. Time: Soak 30 minutes per inch of maximum section with a minimum of 2 hours once tool comes to temperature. Cool in still air.
Dimensional Stability	Average size change as a result of hardening and tempering may not exceed 0.003 inch/inch/maximum dimension if the tool has been stress relieved before finish machining. If stress relieving is not performed as recommended, dimensional stability may be inconsistent and cannot be guaranteed.

Characteristics

- Excellent lubricity and anti-galling for forming applications
- Does not need to be surface treated
- Excellent machinability
- Good toughness

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