

ELMAX™

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	1920-2010°F (Normally 1980°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 1000°F, then equalize center and surface. Continue to 700°F and equalize. Then cool in circulating air.	Alt. 1 Quench in salt 900-1000°F, equalize then air cool Alt. 2 Quench in oil 150°F until the part is black, then air cool Alt. 3 Circulated air.	Alt. 1 Oil 150°F until the part is black, then air cool Alt. 2 Circulated inert gas. Alt. 3 Circulated air.
Tempering (minimum two times) Temper immediately after quenching when the tool or part reaches 150°F	Temperature 480°F 980°F Time: 1 hour per inch of wall thickness, or hold at temperature a minimum of 2 hours.	Hardness 56-58 HRC 57-59 HRC	
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*

• For maximum dimensional stability sub-zero treatment can be applied. An increase of 1-2 HRC can then be expected. Avoid intricate shapes due to the risk of cracking.

* Cooling rate must be adequate to ensure good mechanical properties. However, also consider the risk of excessive distortion from very fast cooling.

ELMAX™ - Wear resistant P/M stainless mold steel

- Special manufacturing techniques - very good polishability
- Isotropic mechanical properties - greater reliability in production
- Excellent dimensional stability, good corrosion resistance

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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