Advanced High Pressure Gas Quenching Vacuum Heat Treating Furnace Process for Coining Dies

Through years of dedicated research and development, the Royal Canadian Mint has mastered coining dies to optimize the micro-structure of the die surface, minimize distortion and maximize die life.

This vacuum heat treating process—developed by the Royal Canadian Mint leveraging Seco-Warwick technology—offers uniform hardness, surface quality and optimized micro-structure of dies for superior die performance.
DIE STEELS

The die steel and heat treatment processes play an important role in increasing the resistance in cracking, chipping and shocking by providing strength, hardness and toughness.

When it comes to die steels, strength and toughness contribute to success. **Strength** is needed to endure the tonnage used. **Toughness** of the steel is required to resist cracking, chipping and fatigue. The result of combining heat treating processes developed by the Mint with the Physical Vapour Deposition (PVD) coating achieve optimal wear resistance and performance. Strength and toughness are achieved by virtue of the tool steel. PVD coating provides wear resistance while the subsurface of tool steel is realized through strict processing controls.

HEAT TREATING PROCESS FOR TOOL STEEL

Mint engineers have carefully mastered the heat treating process to achieve excellent surface quality and uniform hardness. High purity of a furnace environment is critical. With our vacuum heat treating process, removal of volatile contaminations and out-gassing of load surface is maintained.

Furthermore, a capability of convection heating allows hardening and tempering to be done in automatic operation within the same vacuum chamber without unloading.

A high pressure gas quenching technology is the best heat treating solution for circulation and numismatic coining dies. Process optimization and control make it possible to achieve uniform microstructures and properties of the surface and body for coining dies.

The **Royal Canadian Mint** collaborated with **Seco-Warwick** to bring you innovation and expertise in heat treating and coining dies processes.

SM&RT VISION—SM&RT is a promise that your country’s story is in safe hands. Technology is the cornerstone of the Royal Canadian Mint’s SM&RT service package. Built on the industry’s most cutting-edge techniques and brightest talent, SM&RT technology provides the beautiful, affordable and proven foundation for you to tell your country’s story.

The Royal Canadian Mint is the global leader in minting through people, innovation and quality.

**BENEFITS**

- Superior cooling rate with 15 Bar gas quenching pressure
- Shorter cycle time with convection heating system
- Quenching and tempering in same automatic processing operation with convection heating
- User friendly computer control system
- Excellent surface quality and cleanliness
- Uniform hardness and quenching capability
- Minimal distortion and dimensional stability
- No scaling, no discoloration and no decarbonization
- Easy and clean operation when compared to oil quenching processes

**APPLICATIONS**

Coining dies for:
- Circulation Coins
- Numismatic Coins
- Bullion, wafers
- Security Tokens