



MINTSHIELD™
SURFACE
PROTECTION

SOLVING THE SILVER BULLION

WHITE SPOT PROBLEM

White spots on silver bullion coins have been a known issue in the global bullion market for years. While white spots do not change the purity or composition of bullion coins, investors have expressed concerns about their impact on the coins' aesthetic quality — a fact that presented a challenge for the R&D and engineering teams at the Royal Canadian Mint.

Determined to get to the bottom of the elusive white spot problem, the Mint engaged in a four-year process of research and exploration that culminated in 2018 with the announcement of MINTSHIELD™ surface protection, the first proven, proprietary solution for significantly reducing the occurrence of white spots.

HIGH-TECH DETECTIVE WORK

White spotting is not like tarnishing or other oxidation phenomena. Its appearance is unpredictable and irregular. The Mint's engineering team knew the first order of business was to identify the root cause of the spots.

"Our team considered every factor that could possibly play a role, including chemical, environmental, handling and storage conditions," explained Dr. Xianyao Li, Chief Technology Officer at the Royal Canadian Mint. "We used the full range of tools at our disposal: image analysis system, X-Ray spectroscopy for compositional analyses, and surface microstructure and morphology examinations."

To expand the scope of its investigation, the Mint collaborated with a local Canadian university to take advantage of its laboratories.

The Mint's research concluded there is no single cause of white spots. Multiple factors have an impact, including the way silver

reacts with contaminants in processing, handling and storage. While this makes it challenging to come up with a single, definitive solution to the issue, by the end of its intensive investigation, the Mint believed it had identified a way to reduce and contain white spots.

PUTTING THEORY TO THE TEST

With a prospective solution identified, the Mint began testing. On a small scale, the results were positive. The Mint's technique reduced the occurrence of white spots. But the real measure of success was confirming it worked at production scale, with consistent outcomes even across different coin finishes and textures. Accelerated testing confirmed the surface protection would significantly reduce the appearance of white spots for years.

All along the Mint's research team knew the viability of the solution depended on its ability to integrate with existing production and quality control processes. "That was one of our mandates right from the beginning," said Dr. Li. "MINTSHIELD needed to

fit with what we already do while delivering on quality and manufacturing efficiencies."

BULLION REDEFINED

All Silver Maple Leaf bullion coins dated 2018 and later are now protected with MINTSHIELD, significantly reducing the occurrence of white spots.

"Our goal, as always, was to arrive at a customer-focused solution drawing on the Mint's extensive R&D expertise and our unrelenting commitment to innovation. MINTSHIELD is engineered to support the long-term protection and integrity of bullion coins to meet the needs of the global market," said Sandra Hanington, President and CEO. "Combined with Bullion DNA™ anti-counterfeiting technology, it represents the next step forward in delivering the quality, security and aesthetic excellence investors expect of our Silver Maple Leaf bullion coins."

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