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# Background Information

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## REFINING GOLD AT THE ROYAL CANADIAN MINT

The Royal Canadian Mint has refined gold at its Ottawa facility since 1911.

The Mint employs a two-stage process to refine the purest gold bullion in the world: the Miller chlorination process, to produce .995 fine gold, and the Wohlwill electrolytic process, which further refines gold to a purity level of .9999 fine (or 99.99% pure gold). Having enhanced this method through a proprietary process, the Mint can also refine gold to 99.999% purity to manufacture the world's only 99.999% pure gold bullion coins, as well as limited-issue collector coins.

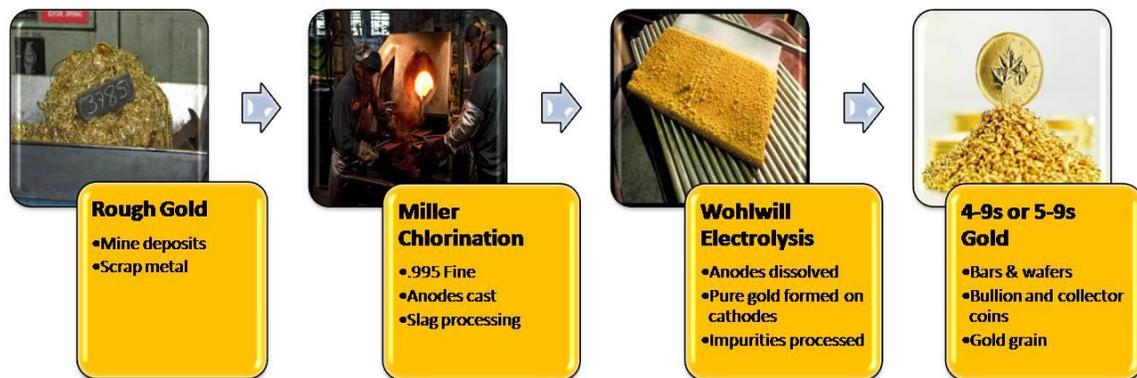
The refining process starts with the delivery of rough gold in several forms: as impure "dore" bars deposited by mining companies or as scrap metal such as jewellery, old coins and industrial products, delivered by gold recyclers. This rough gold contains up to 60% silver and base metals, such as copper and zinc, which must be extracted in order to produce pure gold.

Once the rough gold has been melted in a crucible at a high temperature, chlorine gas is injected into the molten mass. Chlorine attacks base metals and silver in preference to gold. A mix of silver chloride and base metals rises to the top of the molten mass in the crucible to form a layer of by-product. These by-products are skimmed from the crucible, leaving only .995 fine gold. All refining by-products contain some gold, which the Mint recovers through both a proprietary internal process and using third party processors.

The remaining .995 fine gold is cast into anodes in preparation for the final Wohlwill refining process. This electrochemical process involves placing a gold anode into an acid-based electrolyte solution. An electrolyte is any substance which has the ability to conduct electric current.

As electric current is applied to the anode, pure gold and other metals dissolve. The gold is attracted through the electrolyte to an electrically-charged titanium cathode, while impurities settle at the bottom of the electrolysis tank. These impurities are also processed for residual gold recovery. As the anode dissolves, all the pure gold deposits onto the cathode, which is later removed and melted for conversion into gold bars, gold bullion coins or pure gold grain. Depending on intended use, the resulting gold is 99.99% or 99.999% pure.

### MINT GOLD REFINING AT A GLANCE



The Mint is an ISO 9001-2000 certified company, which means that it meets and is committed to maintaining the International Organization for Standardization external quality-assurance standards for production, installation and servicing.

The Mint is also listed as a London Good Delivery provider by the London Bullion Market Association (LBMA). This designation is widely recognised as the *de facto* standard for the quality of gold and silver bars, due to the stringent criteria for assaying standards and bar quality which applicants must satisfy in order to be listed.

The ability to analyze gold accurately is central to the reputation of the Mint's gold refinery. The Mint's sampling and assaying practices are among the industry's most stringent, and our precious metals analytical labs rank among the world's best, as acknowledged by the LBMA. The Mint's assay laboratory is an active participant in the process testing program conducted by the American Society for Testing and Materials. Their independent validation of our fire assay is integral to maintaining our leadership position.

Protection of the environment is a priority in the Mint's refinery operations and stringent controls ensure the environment is not adversely affected. Environmental management controls include emission abatement systems and a closed-loop wastewater recycling system. Waste materials and by-products generated during each step of the refining process are recovered and recycled for residual precious metals.