Precious metals recovery and refining for global industry...  
*With response and responsibility*
Welcome to the Sabin Metal group of companies
Worldwide precious metal recovery and refining services

Sabin Metal Corporation is the largest domestically owned, independent precious metals refiner in North America, serving a worldwide customer base. We recover PGMs (platinum, palladium, ruthenium, rhodium), rhenium, gold, silver, and other precious metals from virtually every source and industry, all of which are described here. Sabin’s gold, silver, platinum, and palladium are accepted on NYMEX/COMEX (Chicago Mercantile Exchange); Sabin’s platinum and palladium are also accepted for delivery on the London/Zurich market by the London Platinum and Palladium Market (LPPM).

For seven decades our technical innovations, conservation policies, and responsive service have helped maximize returns for our customers everywhere. We’ve achieved these goals by providing value added services along with the peace of mind that comes from working with an environmentally responsible refiner.

Let us put our experience, expertise, and proven performance to work for you. We’ll provide you with the industry’s fastest processing turnaround time (to reduce metals costs), fair, straightforward treatment, and extraordinary standards of service. Our philosophy of working with our customers has helped thousands of organizations enhance their profitability, reduce costs, and avoid needless and wasteful environmental problems.

Sabin Metal’s precious metals recovery/refining, sampling, analytical, and processing facilities comprise more than 1 million square feet. Our sales and service offices are located in strategic countries on all major continents.

Sabin Metal (Scottsville) New York is considered the most sophisticated facility of its kind for safely processing precious metal-bearing materials. This facility encompasses more than 500,000 square feet and also houses advanced analytical laboratories and sampling systems, technology and procedures designed to help assure maximum recovery of precious metals from a variety of sources.

Sabin Metal West, a 130,000 sq. ft. facility in Williston, North Dakota is specially equipped to sample soluble and insoluble alumina, silica-alumina, and zeolite PGM supported catalysts from petroleum, petrochemical, and chemical processing activities. The Williston refinery employs electric arc furnace (EAF) technology, and incorporates a unique “low dust” sampling system for accurate sample derivation and total environmental safety and compliance.

SMC (Canada) Ltd., our McAlpine Mill site in Cobalt, Ontario offers capabilities and processing techniques to extract highest possible metal values from residual materials generated in refining, smelting, and milling operations. The Mill incorporates a 220-ton per day gravity/flotation circuit that also permits recovery of precious metals from materials previously considered uneconomical to reclaim.

Sabin International Logistics Corp (SILC) is a licensed hazardous waste, hazardous materials, and general commodities transporter providing global transportation and logistics for spent precious metal-bearing catalysts and other materials. SILC operates its own fleet of trucks, and is also a Permitted and Licensed Freight Broker.

Full details at www.sabinmetal.com
Comprehensive sampling methods—the keys to maximum recovery of precious metals from your process or product

At Sabin Metal, we’ve always looked outside the box to meet our customers’ requirements—for more than six decades

To accurately determine the amount of precious metals present in materials for recovery Sabin Metal’s refining plants use three different sampling techniques. These are dry sampling, melt sampling, and solution sampling. Each of these techniques offers specific advantage; selection of the appropriate method depends upon the type of material being processed as well as its estimated precious metals content.

Application-matched sampling procedures enhance accuracy, help maximize precious metals returns for added value

Fundamentally, the principle of sampling involves “reducing” large quantities of precious metal-bearing material (as much as many tons) into small quantities (as little as a few grams). Samples are then extracted for analysis from different fractions and/or different stages of the resultant sub-lot. The sampling procedure begins by converting precious metal-bearing scrap materials into a homogeneous mass so that precious metals and other constituents are evenly distributed. Results of sampling the homogeneous mass thus represent an accurate ratio of the precious metals content in the overall matrix.

At Sabin Metal, we’ve always looked outside the box to meet our customers’ requirements—for more than six decades

Melt Sampling
Melt sampling is a process in which a carrier metal such as copper is melted along with the material, with the resulting molten metal stream sampled at the beginning, middle, and end of the pour. Subsequent processing steps yield an extremely high degree of accuracy, with tolerances as close as ± 1% between samples. This technique is generally used with high-grade materials that contain significant amounts of precious metals.

Solution Sampling
Solution sampling is used for precious metal bearing solutions; it is cost-effective and extremely accurate in determining precious metals content by volume. This technique also involves achieving a homogeneous dispersion of precious metals and other constituents to the molecular level with precisions comparable to melt sampling. Multiple samples are also taken from different parts of the solution for further analysis. In addition to gold cyanide or palladium electroplating solutions, materials that can be easily dissolved in a reagent are also sampled with this technique.

Dry Sampling
Dry sampling is used when materials cannot be dissolved in a solution or are inappropriate to melt, either because of their structure, or because of the costs associated with melting vs. the possible return. Because it is difficult to achieve homogeneity dry sampling is more complex and potentially less precise than melt or solution sampling. Materials for dry sampling are homogenized, generally by grinding large pieces into smaller and ever finer particles. The material is allowed to free fall into a stream into a cross cut, timed automatic sampler.

This continuous catalyst sampling system generates homogeneous, consistent, and reproducible intermediate samples. Advanced automation methods produce samples that accurately represent entire lots of spent catalysts. Dust generated during the sampling process is captured and sampled later to recover precious metals.

Incoming materials are recorded and cataloged to assure lot integrity throughout the entire sampling and assaying process. Tracking numbers help assure that customers’ materials are processed individually.

SA-BINs™ secure containers store spent PGM bearing catalysts for fast and hassle-free shipping directly to our refining facilities.

Many types of equipment are used to reduce samples from dry materials. At left: an auto sampler for producing large bulk samples; at right: an automatic rotary sample splitter for obtaining intermediate samples.
We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

• Point-to-point logistics and transportation services—worldwide
• In-plant pre-burning capability for one stop, single source processing
• Continuous sampling systems yield statistically valid samples
• State-of-the-art laboratory for accurate and precise analysis
• Total environmental compliance assures peace of mind
• Compliance with the anti-money laundering rule of the U.S.A. PATRIOT Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com

Sabin employs a variety of custom-designed equipment for dry sampling spent catalysts.

Dry Sampling (continued)

Representative samples are taken periodically with the timed automatic sampler; precious metal bearing catalysts are usually sampled with this technique. Some precious metal bearing materials can be sampled by only one of the three methods described; however, others may be sampled by more than one method. Determining which one to use, and when, can be critical with regard to maximizing the accuracy and precision of sampling.

Sabin’s state-of-the-art laboratory assures accurate and precise analysis

Advanced instrumentation and comprehensive systems and procedures help maximize returns

Sabin’s analytical laboratory uses classic volumetric, gravimetric, and fire assay techniques, advanced X-ray fluorescence techniques, atomic absorption (AA) and inductively coupled plasma (ICP) emission spectroscopy. Instrumentation and processing techniques provide the most accurate methods for determining precious metals content.

This rotary sampler is used to produce representative, small-scale samples.

Sabin’s analytical laboratory employs X-ray fluorescence equipment, atomic absorption and inductively coupled plasma (ICP) emission spectroscopy instrumentation, and classic volumetric, gravimetric, and fire assay techniques. X-ray fluorescence helps determine the approximate content of precious metal that is recoverable in a specific lot.
We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

- Point-to-point logistics and transportation services—worldwide—for your spent catalysts
- In-plant pre-burning capability for one stop, single source processing
- Continuous sampling systems yield statistically valid samples
- State-of-the-art laboratory for accurate and precise analysis
- Total environmental compliance assures peace of mind
- Compliance with the anti-money laundering rule of the U.S.A. Patriot Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com

Recovery and refining of precious metals from hydrocarbon and petroleum processing catalysts

Sabin recovers and refines PGMs and other precious metals from hydrocarbon and petroleum processing catalysts with soluble and insoluble alumina, silica-alumina, zeolite, and carbon supports

Precious metal-bearing catalysts are commonly used for facilitating or accelerating hydrocarbon/petroleum production processes, and are typically formulated as pellets, beads, and monolithic structures.

Sabin offers practical, cost-effective recovery of platinum/rhenium reforming catalysts regardless of solubility—with maximum returns

After years of research, Sabin scientists have developed a unique method of recovering rhenium from hydrocarbon processing catalysts. Innovative technology allows us to offer the same performance and quality standards for recovering and refining rhenium as our other precious metals recovery processes.

- Rhenium recovery from spent semi-regenerative and cyclic fixed-bed catalysts
- Rhenium returned as ammonium perrhenate to catalyst manufacturers’ specifications

Hydrocarbon and petroleum processing catalysts are processed at Sabin Metal West using a variety of methods depending upon materials. Dual electric arc furnaces double pyrometallurgical processing throughput to help assure maximum recovery of remaining PGMs in spent catalysts—including rhenium.
We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

- Point-to-point logistics and transportation services—worldwide—for your spent catalysts
- In-plant pre-burning capability for one stop, single source processing
- Continuous sampling systems yield statistically valid samples
- State-of-the-art laboratory for accurate and precise analysis
- Total environmental compliance assures peace of mind
- Compliance with the anti-money laundering rule of the U.S.A. PATRIOT Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com

---

Sabin recovers and refines PGMs from catalysts used to facilitate reactions of various intermediates used for processing and production of chemicals and pharmaceutical products. We recover precious metals from a variety of carriers including carbon supports, calcium carbonate, soluble or insoluble alumina, silica/alumina, or zeolites.

- Pharmaceutical products using palladium on carbon, platinum on carbon, and other pharmaceutical catalysts using gold
- PTA – Chemical products using palladium on granular carbon
- VAM – Chemical products using palladium and gold on alumina silicate
- Chemical products using platinum on carbon, palladium on calcium carbonate, and various gold compounds

Sabin recovers and refines PGMs from catalysts used to facilitate reactions of various intermediates used for processing and production of chemicals and pharmaceutical products. We recover precious metals from a variety of carriers including carbon supports, calcium carbonate, soluble or insoluble alumina, silica/alumina, or zeolites.

- Pharmaceutical products using palladium on carbon, platinum on carbon, and other pharmaceutical catalysts using gold
- PTA – Chemical products using palladium on granular carbon
- VAM – Chemical products using palladium and gold on alumina silicate
- Chemical products using platinum on carbon, palladium on calcium carbonate, and various gold compounds

Recovery and refining of precious metals from spent chemical and pharmaceutical processing catalysts

Sabin recovers and refines spent catalysts from chemical and pharmaceutical processing industries to maximize your returns, lower your cost, and increase your profits

Sabin recovers precious metals from many different carriers incorporating carbon supports, soluble or insoluble alumina, silica/alumina or zeolites used in chemical processing industries.

A custom designed “car bottom” thermal reduction furnace speeds processing turnaround time significantly for large volumes of materials. Systems such as these at our refining facilities help eliminate downtime to enhance efficiency, speed processing, and reduce costs.

A custom designed “car bottom” thermal reduction furnace speeds processing turnaround time significantly for large volumes of materials. Systems such as these at our refining facilities help eliminate downtime to enhance efficiency, speed processing, and reduce costs.

We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

- Point-to-point logistics and transportation services—worldwide—for your spent catalysts
- In-plant pre-burning capability for one stop, single source processing
- Continuous sampling systems yield statistically valid samples
- State-of-the-art laboratory for accurate and precise analysis
- Total environmental compliance assures peace of mind
- Compliance with the anti-money laundering rule of the U.S.A. PATRIOT Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com
Recovery and refining precious metals from nitric acid catalysts and process plants

Sabin's integrated services and products for recovering nitric acid catalysts and process equipment residue will enhance your profits, speed production, and add peace of mind with advanced sampling, refining, and environmental conservation methods. We'll return maximum values of PGMs from your recovery gauzes and process equipment, and also provide custom-configured palladium recovery gauze systems—with on-site installation to reduce downtime, speed production, and minimize costs.

Sabin recovers and refines platinum, palladium, and rhodium from nitric acid processes

- Total capability PGM recovery and refining services—from catalyst to storage tank—anywhere, anytime
- Low pressure drop palladium getter gauzes—design, installation, and refining
- Refining of PGMs from process gas and acid filters
- Recovery of PGMs from plant residues—storage tanks, vacuum cleanings, sweeps, etc.
- Non-destructive cleaning of plants and plant components using mobile on-site PGM recovery services; recovery of PGMs
- Destructive recovery of PGMs from redundant or decommissioned plant equipment
- Metal trading services for recovered metals

Sabin offers full capabilities for custom design and installation for low pressure drop palladium getter gauzes, in addition to mobile or in-house recovery of precious metals from filters, tube bundles, heat exchanger surfaces, storage tanks, air pre-heaters, tail gas heaters, cooler/condensers, and other nitric acid process equipment.

We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

- Point-to-point logistics and transportation services—worldwide—for your spent catalysts
- In-plant pre-burning capability for one stop, single source processing
- Continuous sampling systems yield statistically valid samples
- State-of-the-art laboratory for accurate and precise analysis
- Total environmental compliance assures peace of mind
- Compliance with the anti-money laundering rule of the U.S.A. PATRIOT Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com
Many electronic components contain valuable precious metals that must be recovered. Sabin’s services for recovering and refining their remaining precious metals also help protect our environment.

We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

- Point-to-point logistics and transportation services—worldwide
- In-plant pre-burning capability for one stop, single source processing
- Continuous sampling systems yield statistically valid samples
- State-of-the-art laboratory for accurate and precise analysis
- Total environmental compliance assures peace of mind
- Compliance with the anti-money laundering rule of the U.S.A. PATRIOT Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com

Consider these typical electronic components, equipment, and devices that contain gold, silver, platinum, palladium or other precious metals

- MLCCs
- Integrated circuits
- Devices
- Targets
- Flakes
- Powders
- Interconnects
- Gold and palladium plated electronic components
- Ceramic packages
- Thick- and thin-film materials
- Membrane electrode assemblies
- Catalyzed components
- Fuel processor components
- Supported and unsupported catalysts from fuel cell anodes and cathodes

Many electronic components, equipment, and fuel cell membranes

Sabin helps maximize your returns to improve your profit picture

M any electronic components and devices—including those using new fuel cell technology—contain valuable precious metals. When these products are no longer useful their precious metals content must be recovered and refined. If you’re involved with parts rejects, obsolete products, customer returns, or product/processing by-products, let us provide you with maximum return value for remaining precious metals in those devices or scrap materials.

- Parts rejects
- Obsolete products
- Customer returns
- Production/processing by-products

Recovery and refining precious metals from electronic components, equipment, and fuel cell membranes

We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

- Point-to-point logistics and transportation services—worldwide
- In-plant pre-burning capability for one stop, single source processing
- Continuous sampling systems yield statistically valid samples
- State-of-the-art laboratory for accurate and precise analysis
- Total environmental compliance assures peace of mind
- Compliance with the anti-money laundering rule of the U.S.A. PATRIOT Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com
We invite you to experience the Sabin difference for response—and responsibility—for your precious metal recovery requirements

- Point-to-point logistics and transportation services—worldwide
- In-plant pre-burning capability for one stop, single source processing
- Continuous sampling systems yield statistically valid samples
- State-of-the-art laboratory for accurate and precise analysis
- Total environmental compliance assures peace of mind
- Compliance with the anti-money laundering rule of the U.S.A. PATRIOT Act

Request a free in-plant survey to determine precious metals sources: details at www.sabinmetal.com
Precious metals are used in many processes and products for facilitating and/or speeding chemical reactions, pollution abatement, pharmaceutical production, electroplating, automotive catalytic reactors, hydrogen fuel cells, jewelry, film, and hundreds more. Escalating values of most precious metals have forced users to view their precious metals purchasing and recovery management programs with a keen focus on costs at all levels. Selecting and working with an established, reliable—and reputable—precious metals refiner has become increasingly important for these key reasons:

- You must assure maximum returns of precious metals from your process or product.
- The speed (turnaround time) at which your precious metal-bearing materials are processed will affect your costs.
- Your precious metals refiner must adhere to strict environmental code compliance with regard to atmospheric emissions and effluent discharge/disposal—at all levels, and at all times. Consequently, your relationship with a refiner should consider all possible legal implications associated with violations of environmental laws—including those affecting transportation of hazardous materials.
- Most important, you must work with an organization that you trust, since you are essentially forming a “partnership” with the refiner.

Full service, in-house refining capabilities

The keys to obtaining maximum precious metal recovery values—along with peace of mind and rapid response time—ultimately focus on your refiner’s meticulous attention to hundreds of details, all of which combine to influence the final outcome. All else being equal (highest possible returns and fastest possible turnaround time), environmental violations could create serious problems. These steps—and the refiner’s pollution compliance policies—should provide you with the knowledge and confidence to select (and work with) the right precious metals refiner for your particular application.

Sabin Commodities

Sabin Commodities trades in gold and silver for industry, banks, and other financial institutions.

Sabin works closely with ...

- International Precious Metals Institute’s Environmental and Regulatory Affairs committee
- Organization for Economic Cooperation and Development
- U.S. Environmental Protection Agency
- The Basel Convention
- And other appropriate agencies and organizations

Sabin provides complete, documented traceability for all customers’ materials

All products or materials that contain precious metals may be subject to regulations under the U.S.A. PATRIOT Act

- Compliance with environmental regulations is critical for safe—and legal—recovering and refining of precious metals.
- Sabin’s processing facilities incorporate advanced pollution abatement equipment and systems such as afterburners, bag houses, wet scrubbers, and liquid effluent neutralizing equipment.
- Process water treatment procedures minimize all causes of pollution.
- Full documentation for solids, liquids, and gaseous by-products disposal and for regulatory compliance procedures.
- “Full service” and “full in-house” capabilities (from door-to-door shipping/handling through pre-burning, sampling, and assaying to prompt return of refined materials) to eliminate outside subcontractors for one or more of these activities. Use of outside subcontractors also introduces possibilities of materials loss which can result from third party handling.

How to evaluate, select, and work with a precious metals refiner

Create a mutual partnership with mutual trust

When selecting a precious metals refiner, you must consider legal implications associated with its processing procedures. To determine that the refiner does not violate any applicable environmental protection law or regulation. Regulatory agencies throughout the world not only hold a precious metals refiner responsible for proper treatment and/or disposal of harmful discharges, but their users and owners are responsible as well; therefore, it is critical that your refiner does not violate applicable laws or regulations.

With regard to protecting our environment and your financial interests as well, Sabin Metal is unique among refiners. Our environmental protection and conservation policies are vital for our continued success and for your protection. Our knowledge of (and ability to comply with) the constantly changing maze of international environmental regulations is a key part of the Sabin difference in recovering and refining your precious metals.

Sabin’s recovery and refining methods help protect our planet—and your financial interests

Think globally. Act responsibly. Sabin’s processes for recovering and refining PGMs from spent catalysts raise environmental protection to an advanced state for safety and regulatory compliance.
Precious metals recovery and refining for global industry…

With response and responsibility

Visit us on the web: sabinmetal.com