metallix

A PRECIOUS METALS RECYCLING COMPANY

SUPPORTING THE NITRIC ACID INDUSTRY

Precious Metals Recycling & Refining

Founded in 1968, Metallix is a leader and innovator in the precious metals recycling industry. Metallix purchases, recycles, and refines materials containing gold, silver, platinum, palladium, rhodium and iridium.

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79	47	78	46	45	77
Au	Ag	Pt	Pd	Rh	Ir
Gold 196.967	Silver 107.868	Platinum 195.085	Palladium 106.42	Rhodium 102.906	Iridium 192.22

INTERNATIONAL LOCATIONS

Metallix has international locations across the USA, Europe and Asia serving a global client base for the recovery and recycling of precious metal bearing materials.

Precious Metals Catalyst Recovery

We provide downstream nitric acid plant cleaning, recovery and processing of precious metals catalysts.

NITRIC ACID PRODUCTION

During the course of the ammonia oxidation reaction, platinum group metal (PGMs) are lost from the catalyst. These losses travel downstream through the heat train, in the form of a PGM oxide. Over time, a build up of scale forms on exposed surfaces, reducing thermal efficiency.

As the vapor oxide cools, it becomes a particulate. This dense residue, rich in PGMs, settle throughout the heat train and acid storage tanks.

Recovery of PGM spent catalyst provides valuable revenue for a sustainable future, while respecting natural resources and the environment.

Types of plants & PGM content of recovered material

ATMOSPHERIC / LOW PRESSURE
(found mainly in Eastern Europe)

PGM content of recovered material can vary between 0.02% up to 6%. Plant normally must be greater than 15 years old to warrant any form of recovery.

MEDIUM PRESSURE
(Nearly all European plants)

PGM content of recovered material can vary between 2% to 30%. Recovery is economic after 5 to 8 years, depending on plant production capacity.

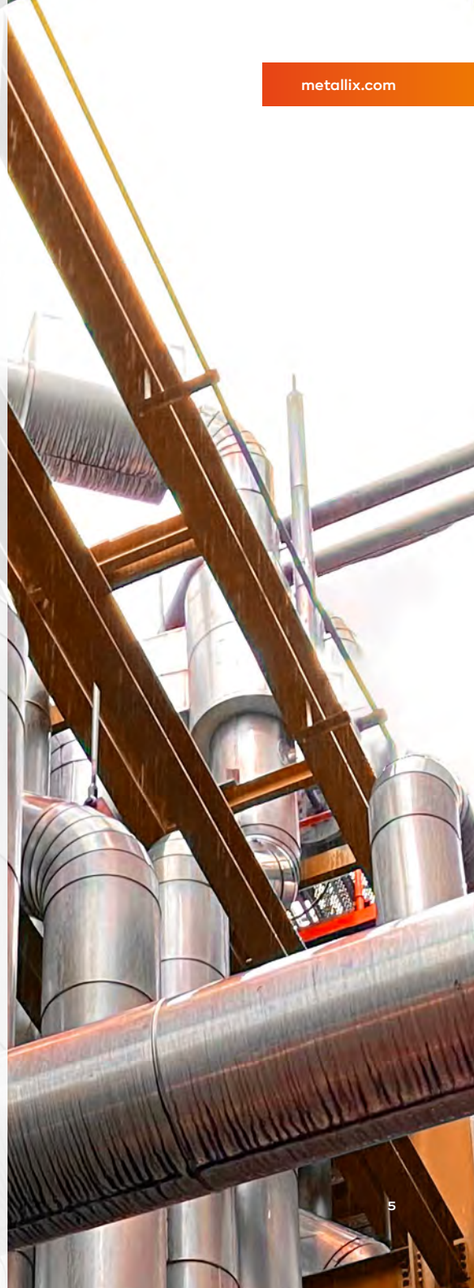
HIGH PRESSURE
(About 80% of all US plants)

Recovered material is very high in PGM content; figures between 6% and 55% are not unusual. Recovery of PGM can be worthwhile every 3 to 6 years.

PRECIOUS METAL GAUZE

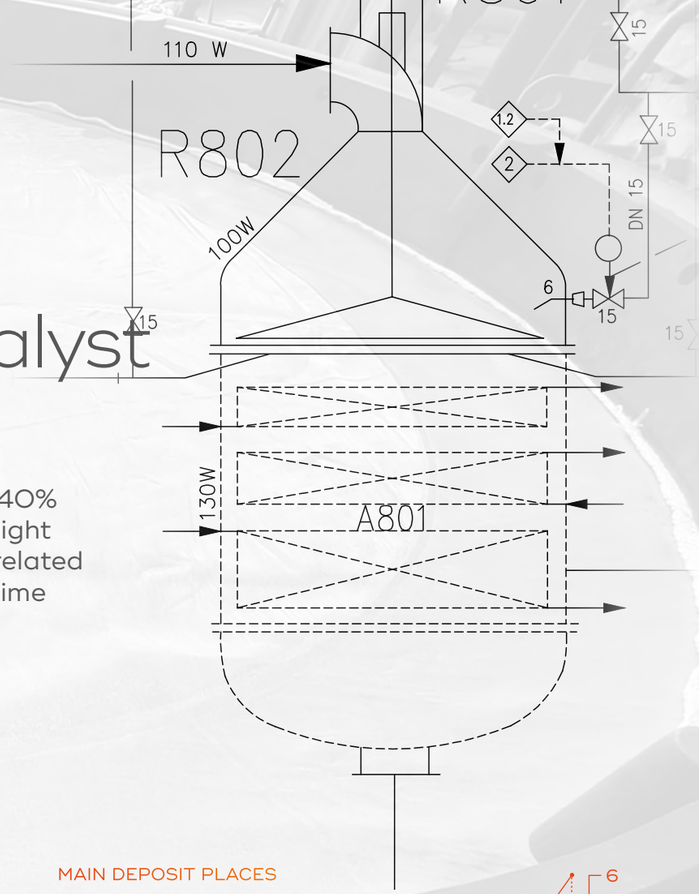
The precious metal catalysts used in a nitric acid plant are in the form of gauzes. The gauzes are an alloy of various metals, mainly Pt with varying additions of Pd and Rh, such as:

- 90% Pt / 10% Rh
- 92% Pt / 8% Rh
- 90% Pt / 5% Pd / 5% Rh
- 95% Pt / 5% Rh
- 95% Pt / 5% Pd



Precious Metals Catalyst Losses

During a campaign, 20 to 40% of the installed catalyst weight is lost. The rate is directly related to surface area, pressure, time and temperature.



CATCHMENT / GETTER SYSTEMS

Nearly all medium and many high pressure plants use catchment/getter systems.

70-80% primary Pt loss

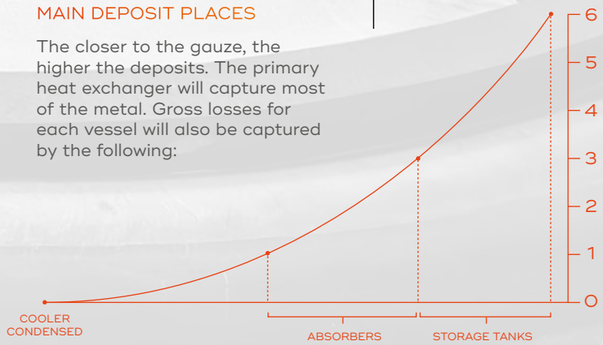
On average, in most medium pressure plants the system recovers between 70 to 80% of the primary Pt loss.

45-65% primary Pt loss

On average, in most high pressure plants this will vary between 45 to 65% of the primary Pt loss.

MAIN DEPOSIT PLACES

The closer to the gauze, the higher the deposits. The primary heat exchanger will capture most of the metal. Gross losses for each vessel will also be captured by the following:



Oxidation of ammonia to nitric oxide

PGM Asset Recovery

> Many plants during the course of their day to day maintenance, accumulate a variety of precious metal-bearing material.

These small lots can be processed easily and expediently without the need to wait for a scheduled turnaround.

- Sweeps / Fines
- Residues collected from vessel opening / Inspection
- Accumulated raschig rings
- Gauze supports / Megapyr
- Reclaim Pt filter media

Project Management & On-site Operations

Our teams can provide responsive technical support to site operators for project management, logistics and refining.

PROJECT MANAGEMENT

- Full technical site survey
- End-to-end project oversight
- Global logistics
- Regulatory compliance
- Expert refining and metal management
- Purchasing of redundant equipment

ON-SITE OPERATIONS

- Mobile equipment
- Minimal footprint
- Fast assembly, relocation and dismantle
- Tailored cleaning solutions
- Safe and sustainable

HYDROBLASTING

Hydroblasting provides plant operators with a non-aggressive, chemical free treatment for the removal and recovery of surface PGM oxide, both tube and shell side. Hydroblasting is proven to be a highly effective, non-invasive method, which can generate high PGM recoveries.

CHEMICAL CLEANING

Recognized internationally, non-aggressive mild chemical treatment is an industry approved methodology for the removal of surface PGM oxides. This treatment is an expedient and effective method to maximize PGM recoveries, while respecting safe working parameters.

STORAGE TANK CLEANING

Nitric acid storage tanks can often be excluded from scheduled maintenance and recovery operations, especially when there is limited storage capacity and demand is high. However, storage tanks can often produce high concentrations of spent precious metal catalyst in the form of residues.

DESTRUCTIVE PROCESSING

Destructive processing is performed on PGM bearing components taken out of service. This aggressive treatment ensures optimal PGM recovery is achieved. Destructive processing can be performed at Metallix's own purpose built leaching facility or on-site at the customer's facility.

Automated Hyrdoblasting

Using Sentinel Technology with compass radial positioning, the automated system provides flexibility to clean horizontal, vertical and enclosed heat exchanger bundles with precision and efficiency, placing safety first.

EFFICIENCY, PRECISION AND SAFETY

Hydroblasting provides plant operators with a non-aggressive, chemical free treatment for the removal and recovery of surface PGM oxide, both tube and shell side. Hydroblasting is proven to be highly effective, non-invasive method, which can generate high PGM recoveries.

- Versatility in a range of confined species.
- Lightweight modular design minimizing set-up time, reducing downtime.
- Radial indexing motion from a single connection point to clean with minimal remounting.
- Cleaning horizontal, vertical and enclosed heat exchanger bundles.

Automated systems

Mild chemical cleaning

Mild chemical cleaning removes the build-up of surface platinum group metal (PGM) oxides.

Removing surface oxides enables a more comprehensive inspection of the component integrity, identifying current and potential problems before they become overly costly or result in downtime.

This non-aggressive treatment is an internationally recognized methodology, effective, expedient and within safe working parameters.

PROPRIETARY BY DESIGN

Metallix, spray cradle system, proprietary by design with fully adjustable sub-frame and telescopic configuration to suit all boiler sizes.

Metallix R & D Department develop methodologies aligned to business models and sustainability goals.

Proprietary by design

Recovery of spent PGM catalyst

Storage tank cleaning

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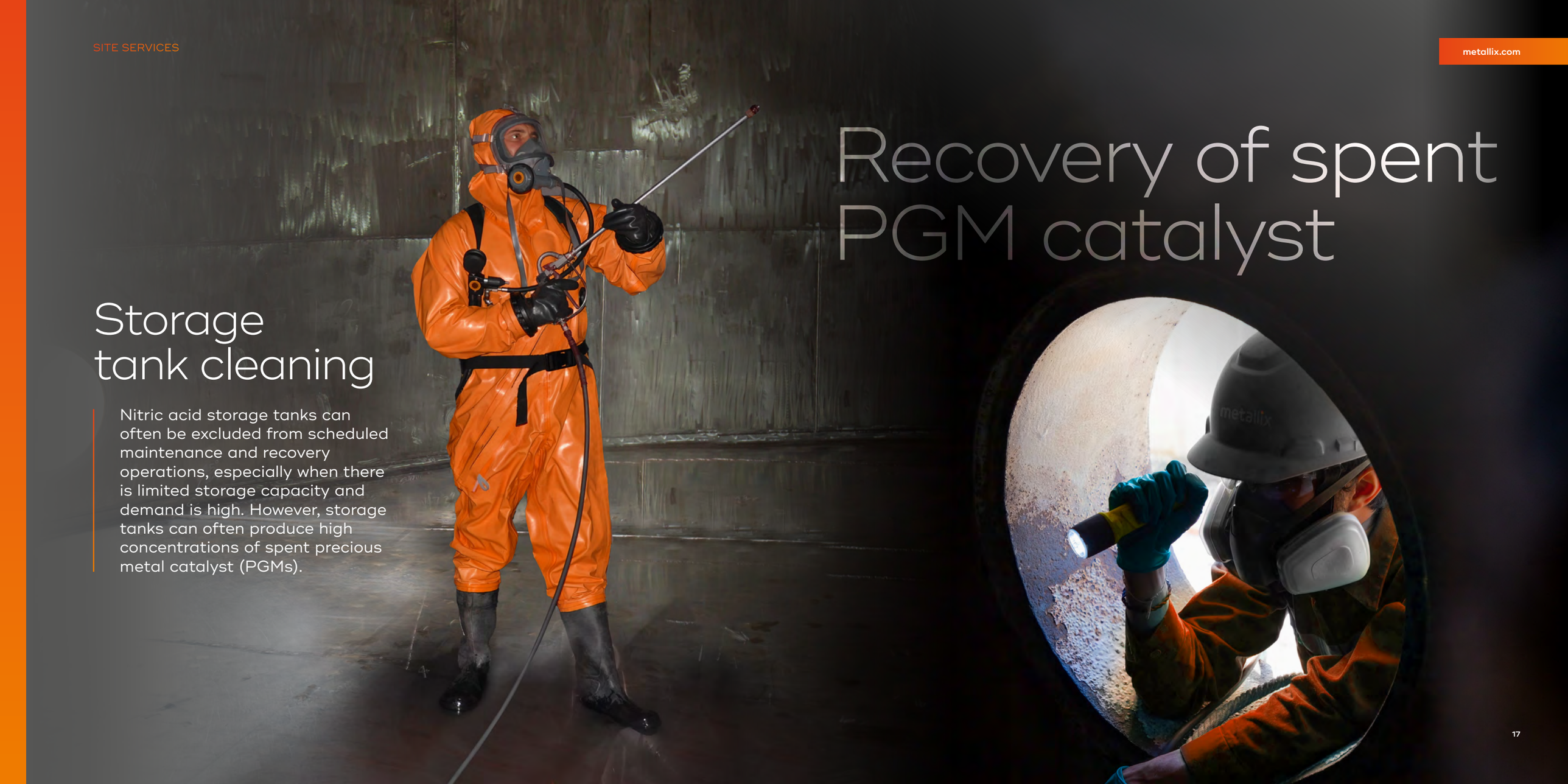

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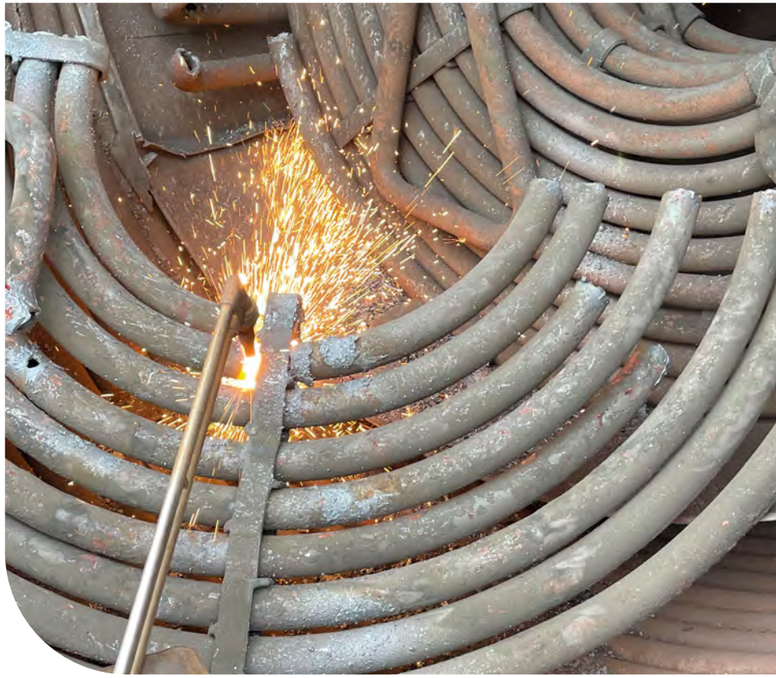

Destructive Processing

PRECIOUS METAL REVIEW BOARD

As with all operations undertaken by Metallix, incoming materials are reviewed by our precious metals review board and dismantling team to maximize value and document component loss data for the supplier.

Generated precious metal residues are strictly audited and moved to our Thermal Reduction Department for further processing.

Logistics & Compliance Global Management

Metallix has registered businesses in the USA, Europe and Asia, operating within an established global logistical framework, compliant with transboundary legislations for the movement of precious metal bearing materials with varying waste classifications.

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LOGISTIC MANAGEMENT

Metallix's multi-model logistics management is tailored to meet your specific requirements, ensuring project timelines are upheld and valuable materials are processed timely.

Certificate of Recycling issued.

GLOBAL LOCATIONS

New Jersey Headquarters
Metallix Refining Inc.
59 Avenue at the Common,
Suite 201,
Shrewsbury, NJ 07702
USA

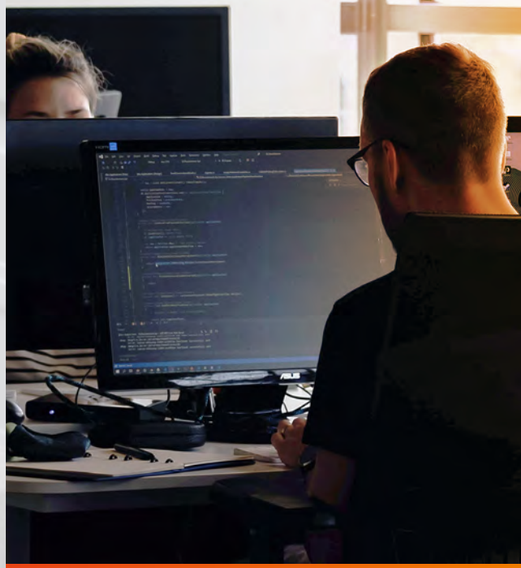
Precious Metals Refinery
Metallix Refining Inc.
251 Industrial Blvd.
Greenville, NC 27834
USA

Metallix Refining Europe Ltd.
The Old Builders Yard,
Wentworth Village,
Rotherham, S62 7SB
UK

Metallix Refining Asia Ltd.
69 Nonhyeongojan-ro, 54 beon-gil,
Namdong-gu, Incheon 21682
Republic of Korea

Integrated Technology with Security Personnel

Metallix takes a proactive approach to security, investing in the right tools and resources for site and customer protection.



SAFETY AT ALL TIMES

Technology has allowed Metallix to implement the most advanced security systems integrating technology with manned security services. With real-time monitoring systems such as sensors and CCTV cameras, our security team can be notified immediately if any suspicious activity is detected, or incident on site occurs.

METAL FREE POLICY

We require that all staff and visitors remove any metal on their person before entering the refinery.

When an employee or visitor both enters and exits the refinery, they pass through our loss prevention X-ray system to identify any metal on their person. Personal belongings are safely held in sealed lockers and returned to their owner when they exit the building.

IN-HOUSE IT TEAM

Operating from our secure facility our in-house IT team are focused on keeping our digital infrastructure secure and private.

Our IT specialists along with robust data protection and security systems ensure against malicious attacks or disruption to business process.

Precious Metal Refinery

Our precious metals refinery is a 150,000 square-foot, ISO 9001:2015 and 14001:2015 certified facility that sits on 20 acres of land in Greenville, North Carolina.

PURPOSE BUILT FACILITY

We are proud of our state-of-the-art precious metals refinery, which we designed from an environmental, health and safety standpoint. This means that the health and safety of our employees and visitors is protected at all times. We continually work to improve our process and invest in new equipment, environmental controls, such as air pollution control and air handling equipment.

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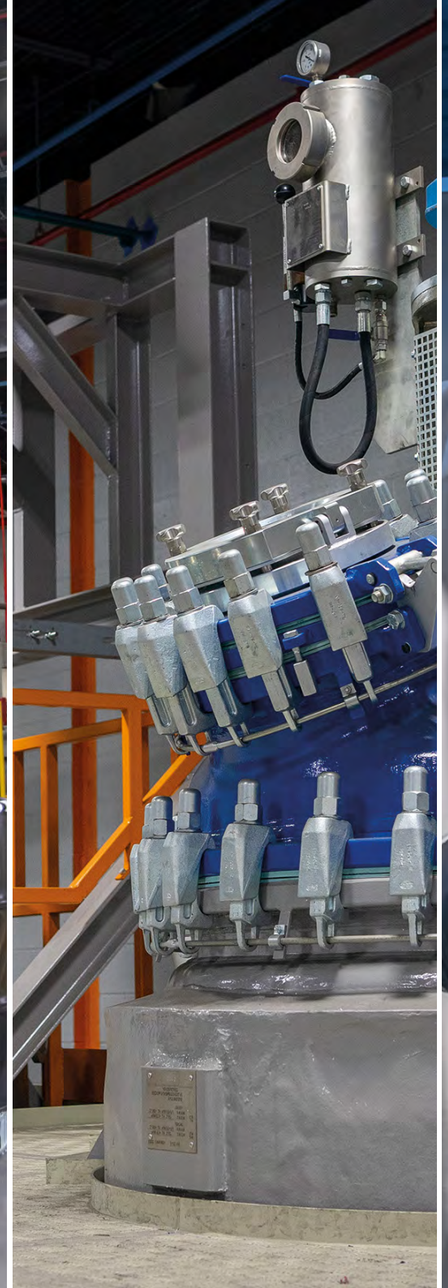
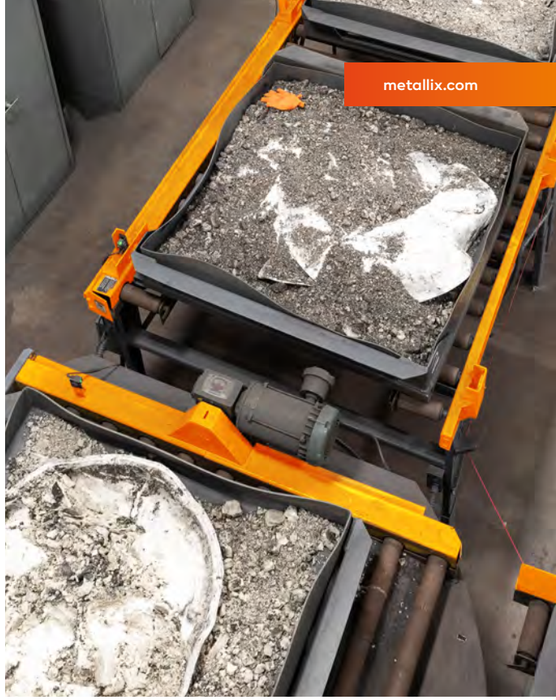


ENVIRONMENTALLY FOCUSED

As a leading recycler of precious metals, Metallix is continually implementing ways for creating a more sustainable precious metal economy and contribute to a more environmentally conscious world.

Thermal Reduction & the APR³

Metallix Refining's pioneering, industry-leading technology allows us to optimize the process of each lot of precious metal bearing materials to enhance their value for customers and suppliers.



UNMATCHED EXPERTISE

Most burnable precious metals materials such as resins, filters, jeweler's sweeps, wipes, jars, catalysts and sludges are extremely valuable but also extremely sensitive to loss during the thermal reduction process. Meticulous engineering and customization of the furnaces is critical to optimizing outcomes and precious metal values.

These factors are why our Thermal Reduction Department offers unmatched expertise in addition to the most advanced equipment in the market.

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APR³

Our internal review board assesses every lot of burnable precious metal bearing material arriving at our facility. Analyzing the physical characteristics, volatility and safety data of each lot, the board draws up ideal atmospheric conditions designed to reduce the possibility of precious metals losses while increasing outcomes and control.

Higher combustion material is reduced using our APR³, an oxygen-starved furnace specially designed for the most vulnerable precious metals. As materials travel through APR³, the furnace thermally reduces the organics surrounding the precious metals by way of radiant heat. It is a turbulent-free environment that minimizes precious metals losses.

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Mechanical Reduction

WATCH VIDEO

Mechanical Reduction Department uses the latest and most advanced equipment to process a wide variety of precious metal bearing materials safely and efficiently.

RIBBON BLENDERS

Materials enter the second stage of processing the automatic ribbon blenders, achieving a uniform particle size for evaluation of precious metal values.

BALL MILLS

Materials are loaded onto to the automated ball mills designed to control noise and airborne particles.

SAMPLING

Samples are extracted during the blending process and prepared using proprietary methodology generating a sample for value analysis by our on-site analytical laboratory.

Analytical Laboratory

The Analytical Lab plays a critical role in supporting innovation at Metallix. The team is involved in developing new recovery methods to improve returns, minimize environmental impact, and allow recycling of new waste streams.

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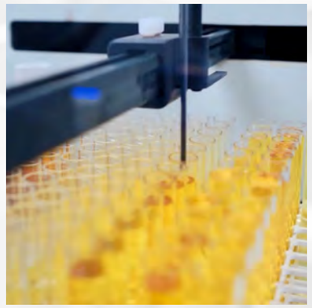

The Metallix Analytical Lab sits at the heart of our refinery. The 4,000-square foot, custom-built laboratory in Greenville, North Carolina is one of the industry's leading facilities and clearly demonstrates our commitment to innovation and growth.

Our highly experienced, diverse team of laboratory technicians and analysts have a thorough understanding of the analytical process and are committed to ensuring that every result is accurate.

The lab is fitted with cutting edge technology and equipment, enabling our staff to select the best tool for each element of the analytical process.

When a new material arrives in the lab, our panel of experts review characteristics and decide what testing needs to be performed prior to processing. We carry out the necessary experiments, determining the optimal conditions for processing.

Environmental stewardship

> As a leading recycler of precious metals, Metallix is continually implementing ways for creating a more sustainable precious metal economy and contribute to a more environmentally conscious world.

At Metallix, we're committed to being environmental stewards, operating in a sustainable, environmentally conscious way every day.

Sustainable working practices improve the quality of all our lives, protect our ecosystem and preserve natural resources. That's why we're taking steps to ensure that our long-term strategy is fully aligned with our sustainability goals.

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WHAT WE'RE DOING WITHIN OUR FACILITIES

In addition to our community clean-up efforts:

- We've switched to motion-activated LED lighting in our facilities
- We've begun adding electric vehicles to our fleet
- We're working towards waste reduction goals
- We've designed and installed bioretention areas at both of our Greenville, North Carolina locations.

Supporting the nitric acid industry

From our locations in the USA, Asia and Europe; our teams can provide responsive technical support to site operators for Project Management, Logistics and Refining.

CONTACT US TO DISCUSS YOUR REQUIREMENTS

When we work together, we can achieve more – today, tomorrow and in the future.

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LEADERSHIP TEAM

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