

# Mining Industry



## **Innovative Measurement Solutions** for the Mining Industry

**METTLER TOLEDO**

# Industrial and Laboratory Solutions for the Mining Industry

**When it comes to precision scales and instruments you need a powerful partner. One who has the strength and know-how in R&D to develop products that add true value to your production processes. One who not only has a truly global presence to serve you even in the most remote global locations, but can provide you with application support and technical assistance, anytime and anywhere.**

## Ore preparation Geological survey



### Highest Weighing Accuracy

In assay laboratories, handling regulus, lead buttons and ore samples requires precision work and reliable instruments. For all these special purposes METTLER TOLEDO has designed a broad portfolio of balances — weighing to the nearest 0.0000001 g up to 64 kg.

## Mine operations



### Reliable Heavy Duty Weighing

Whether you are weighing ore, slabs of metal, iron pellets or copper anodes METTLER TOLEDO provides innovative and reliable heavy duty solutions. Many companies are recovering profits by improving production through weighing. Valuable materials can be legally verified to few tens of kg. Overpayments due to under/overloads are eliminated with accurate truck and rail scales.

## Extraction Concentration



### Exact and Robust Process Monitoring

In-line measurement solutions from METTLER TOLEDO master even the most demanding conditions of temperature or pressure optimizing process quality and throughput. They include several types of sensors for pH, conductivity and more, transmitters, housings and cleaning systems. The optimal combination of them results in the reduction of costs and downtimes.



## Purification Finishing



### **Reliable Analysis of Metal Content**

Determination of metals, moisture or chemicals and reagents by One Click™ titration. Advanced sample flow automation systems for efficient analysis. Instruments from METTLER TOLEDO provide reliable and accurate results at the touch of a finger. Easy-to-use yet efficient. Fast yet hard wearing. Innovative yet robust.

## QC Lab Process development



### **Precise Instruments for Process Development and Quality Control**

Stringent quality control for the exact adherence of product specifications is made viable thanks to top performing, innovative and rugged balances, titrators, density meters, moisture analyzers, lab pH meters, lab reactors, particle size and infrared sensors, on-line pH, conductivity or turbidity sensors from METTLER TOLEDO.

## Maintenance Repair



### **Worldwide Service**

We serve our customers around the globe. A dense service network provides technical support, maintenance and repairs at short response time. Safety and uptime of your operational processes are our concern.

Photo: installation of vehicle scales at McMurdo Station in Antarctica.

# Uncompromized Weighing

## At all steps of Metal Analysis

Be it an assayer, geologist or laboratory assistant, people working with ores or precious metals cannot afford to give anything away. In assay laboratories, handling regulus, lead buttons and ore samples requires precision work and reliable instruments. For all these special purposes METTLER TOLEDO has designed a broad portfolio of balances.

### Add Accuracy to All Steps of Analysis

**The metallurgical assay** is the compositional analysis of an ore, metal or alloy, performed with various methods and instruments. Accurate and precise weighing is fundamental for all stages, from sample preparation to final weighing of prills.

### Get Confidence to Reach the Limits of the Assay

By long tradition, the **fire assay** is the most elaborate method to determine the content of precious metals in ores and alloys. Careful execution is a must for correct and consistent results. The exact and reproducible weighing of the starting lead button to the resulting bead and the remaining gold sheet are the cornerstones of the high method precision and accuracy. METTLER TOLEDO analytical and micro balances provide you with the necessary performance to obtain the ultimate accuracy levels of 1 part in 10 000.

### Eliminate Weighing Errors and Reduce Costs

**Elemental analysis and titration** require accurate preparation of titrants, samples and calibrating solutions. METTLER TOLEDO analytical balances are especially qualified for dosing directly into large tare containers. Sample transfer errors can thus be avoided resulting in significant cost savings, particularly for valuable substances.

With **LabX software** standard preparation is even faster and automatically documented.



From weighing to the nearest 0.0000001 g up to 64 kg, you can be sure to find a METTLER TOLEDO laboratory balance which ideally matches your specific weighing needs.



METTLER TOLEDO XP2U  
ultramicro balance

Au  
Ag  
Al  
Zn  
Cu  
Ni  
Pt  
Fe

### Simple and Efficient Sample Handling



Tare containers of all shape and size can be securely fastened to the balance with **ErgoClips**. Your weighing routine becomes more ergonomic, easier and faster. Dose the precious sample directly into the desired vessel without loss and decanting.

### Weigh the Regulus Properly



Precise weighing of metal content of samples and process controls at each process stage is the basis of the extreme method precision.

### Efficient Weighing of Ultramicro Samples



A specially designed funnel set allows accurate weighing of micro samples, such as prill and regulus, in the shortest time.

# When Ruggedness is of Primary Concern

**Mining operations present special problems that are not common in industry. METTLER TOLEDO understands these problems and builds scales that are tailor-fit to your trucks, trains and challenging environment.**



## No worry about accurate weights

Accurate weighing of extractions and yield can dramatically influence profitability. Smelter materials are weighed for correct finance and for calculating CO<sub>2</sub> emissions. METTLER TOLEDO provides the world's most accurate scales to fulfil your requirements 24 hours per day. Modern weighing terminals and advanced software allow for the complete control of your weighing operations. Scales are approved for static and dynamic weighing.

## For very harsh environments

POWERCELL® – based scales are operating in extreme environments and on all seven continents. They continuously monitor and restrain all seven of the factors that potentially lead to incorrect weight such as severe cold or boiling heat.

### Uncompromised Ruggedness

METTLER TOLEDO is the leader in orthotropic weighbridge design. Scales are based on a unique six-step design process to ensure that your scale survives the abuses of heavy traffic. Rail scales are designed for the heaviest engines and cars.

### Solutions for ATEX Zones

Mines can be explosive areas and ask for special protection means. However, performance need not be compromised. That is why METTLER TOLEDO presents the most manifold range of scales and terminals for ATEX zones.

## When help is far away

Predictive self-monitoring and diagnostics alert you to an issue before it becomes a costly production stopping maintenance event. POWERCELL® load cells can be exchanged in minutes rather than hours.

### Seamless Transfer of Data

Robust and proven terminals securely link to your production system for faultless data transfer, either hardwired or wireless.

### Efficient Equipment Management

Customizable scale software processes weighing transactions quickly and accurately. Its database stores a complete record of each transaction and allows the data to be shared with other computer systems.



### POWERCELL in a 250 t scale in Siberia at -60 °C

POWERCELL® load cells have stood up to the most extreme forces for more than 20 years. They are proven for submersion, lightning strikes of 80,000 amp and temperatures that are common to mining operations.



Steel-deck weighbridges are designed for weighing the large and heavy trucks for off-road hauling.

### Reducing Weighing Time of Rail Cars



The coupled in-motion rail scale and the IND9R86 Rails Scale controller eliminate coupling and uncoupling of rail cars. Weighing occurs precisely whilst cars are moving at 3 – 5 mph. This is much faster and safer than static weighing.

### Weighing Modules for Conveyors and Hoppers



A full range of load cells and weighing modules enables a quick and safe conversion of a conveyor system into a scale. Weigh your flow of materials precisely.

### Uncompromized Accuracy Saves Your Profit



Worn but structurally sound scales can be upgraded to bring back accuracy and reliability. Easy to install conversion kits are available. This is a cost effective investment. POWERCELL® technology can even pay for itself thanks to savings from improved accuracy.

# Concentration and Extraction

## Automatic In-Line Control

**Mining processes run under many different and tough working conditions. METTLER TOLEDO process analytics solutions master even the most demanding conditions of high temperature or pressure. In addition, the in-line measurement instruments integrate smoothly into plant wide process control and asset management systems.**



### Reduce Downtimes and Costs

Measurement solutions from METTLER TOLEDO optimize process quality and throughput. They include several types of sensors, transmitters, housings and cleaning systems. The optimal combination of these results in reducing costs and downtimes.

### In-line Optimization of Leaching and Precipitation

Monitor pH value and DO concentration during **bioleaching** to keep bacteria healthy with optimal oxygen injection. Hold lime dosage at the optimal level.

In **gold cyanide bleaching**, pH value and DO are used to ensure process safety and increase the leaching speed.

pH control of **precipitation** steps increases the yield and ensures product quality.

### Highly Efficient Extraction

pH measurement before and during the **solvent extraction** reaction assures optimal metal extraction and yield.

pH control in **flotation** guarantees high quality of the metal concentrate and saves costs thanks to adequate lime and acid dosage.

Waste/solids separation in **thickeners** is improved by turbidity control. Water can efficiently be reused.



#### Rugged and watertight portable meters

Taking measurements on site or in the field saves time, allows for immediate adjustments and avoids transporting samples to the lab.

Read more about pH measurement for lab and process applications

► [www.mt.com/ph-solutions](http://www.mt.com/ph-solutions)



METTLER TOLEDO  
sensors and transmitters

### Long Life Sensors – Simply Installed



Even under the most demanding situations, METTLER TOLEDO's process sensors provide accuracy and longevity. Rugged design and solid manufacture bring durability and increased resistance.

Intelligent Sensor Management (ISM) technology reduces efforts for installation, maintenance and calibration to a minimum. This considerably improves productivity and system availability.

### Safe and Flexible Transmitters



The right transmitter for your application to link the sensor securely to your process control system. Safe and quick error elimination thanks to full diagnostic capability. METTLER TOLEDO's transmitters are certified for ATEX or FM operations.

### Sensor Exchange Anytime



Retractable housings allow safe access to sensors for cleaning or replacement, without process interruption. They are certified for hazardous area use (ATEX, FM).

More details about ISM  
Intelligent Sensor Management

► [www.mt.com/ism](http://www.mt.com/ism)

# The Right Tools For the Right Content

**Instruments from METTLER TOLEDO provide reliable and precise results at the touch of a finger. Easy-to-use yet efficient. Fast yet hard wearing. Innovative yet robust.**

## Save Chemicals, Increase Yield

Control of pH value and conductivity helps to save chemicals and electrolytes of the electrolytic process in **electrowinning and refining**. Turbidity measurement after **filtrations** helps to detect filter breakthrough at an early stage and guarantees product quality. Thus, high yields are achieved.

## Optimize Production with Just One Click

Determine the concentration of the target metal and the leaching reagents to monitor and improve the **leaching process** with METTLER TOLEDO titrators. Efficiency and optimized leach consumption are your benefits.

Titrate quantitatively the composition in the **purification and precipitation processes** in order to minimize the consumption of chemicals and electric power, keep the process time short and achieve the required purity of the final metal.

## Vital Parameters for Ore Storage and Processing

Halogen Moisture Analyzers provide dry mass, moisture content or total solids (TS) results of processed and stored ores in minutes. This saves you countless hours in the lab and provides key information for efficient **ore processing** and **tank management**.



Determine metal content and concentration of reagents, buffers and additives by titrations. Touch the shortcut and start the titration with One Click™.



Determine moisture of processed ores, tank contents, slime, cake, pulp or sludge.

### Control the Sample Flow



The Rondo sample changer helps you to master the flow of titration samples and keeps your hands free for other tasks.

In combination with Titration Excellence line you get an efficient analysis system to automate your routine work.

► [www.mt.com/titration](http://www.mt.com/titration)

### Wastewater Treatment



Monitor cyanide decomposition carefully with pH and ORP measurements and keep costs of alkali and acid dosage at optimum levels. Measure pH, conductivity and dissolved oxygen (DO) in effluents of water treatment plants. METTLER TOLEDO offers the right sensors and the right transmitters.

► [www.mt.com/InPro4010](http://www.mt.com/InPro4010)

### Manage Filtration Perfectly



In-line turbidity measurement with METTLER TOLEDO measurement solutions is ideal for monitoring filtering. Thanks to forward and back scattered light sensors, METTLER TOLEDO turbidity sensors are best suited to detect filter breakthrough and hence prevent product loss.

► [www.mt.com/InPro8400](http://www.mt.com/InPro8400)

# R&D and Quality Control

## The Secret of an Efficient Laboratory

**To ensure product quality, mining operations need the best testing instruments available. METTLER TOLEDO can help your quality control program by supplying weighing and measuring equipment for use in both laboratory and production environments.**

### Process Development

Mining operations need the best production processes. High yield, low costs and minimum use of chemicals are prerequisite for successful mining. METTLER TOLEDO analytical instruments help you. Lab reactors, particle size and infrared sensors, in-line pH, conductivity or turbidity sensors, all contribute to boost productivity.



RC1 and LabMax automatic lab reactors provide plant-like conditions for the simulation and optimization of processes.

### Quality Control

Stringent quality control for the exact adherence of product specifications is made viable thanks to top performing, innovative and rugged balances, titrators, density meters, moisture analyzers and lab pH meters from METTLER TOLEDO.

Titration has long been widely used to determine the content of metals and chemicals in many samples along the mining and refining processes.

### Safety

Comply with ATEX, Factory Mutual (FM), Good Laboratory Practice (GLP) and other regulations in order to protect employees as well as plant equipment. Depending on the application, METTLER TOLEDO instruments are compliant.



Water determination according to Karl Fischer method e.g. to check fuel and lubricant quality.

As an example, a large range of bench, floor and vehicle scales meet the ATEX requirements. And analytical instruments such as titrators and density meters are fully compliant with GLP regulations.



### Density of Liquids Within Seconds



Density measurements of lubricants, oils or process chemicals prove the specs and identify the product. Automation for one sample or series of samples adds relief and comfort to the density determination. All done in the speed of sound with METTLER TOLEDO's LiquiPhysics automatic solid state density meters.

► [www.density.com](http://www.density.com)

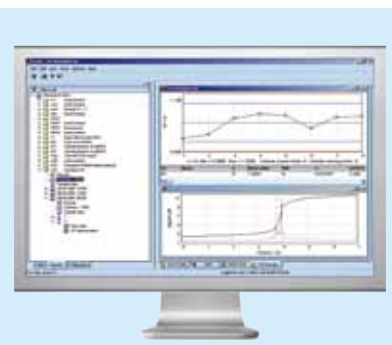
### Optimize Flocculations and Sedimentations



Flocculation effectiveness influences downstream separation, settling, flotation, and purification. Particle measurement technology tracks in real time changes of the floc distribution while measuring in-line at full process concentrations with no sampling required. These instruments allow flocculent performance to be quickly optimized in the laboratory.

► [www.mt.com/autochem](http://www.mt.com/autochem)

### No Worry With Data Transfer



Imagine controlling all your titrators and balances via a network; maintaining all your data securely but easily accessible on a central server; looking at the analysis results directly in your office or using exactly the same method for all the titrators via the network... With LabX all this becomes a reality.

► [www.mt.com/labx](http://www.mt.com/labx)

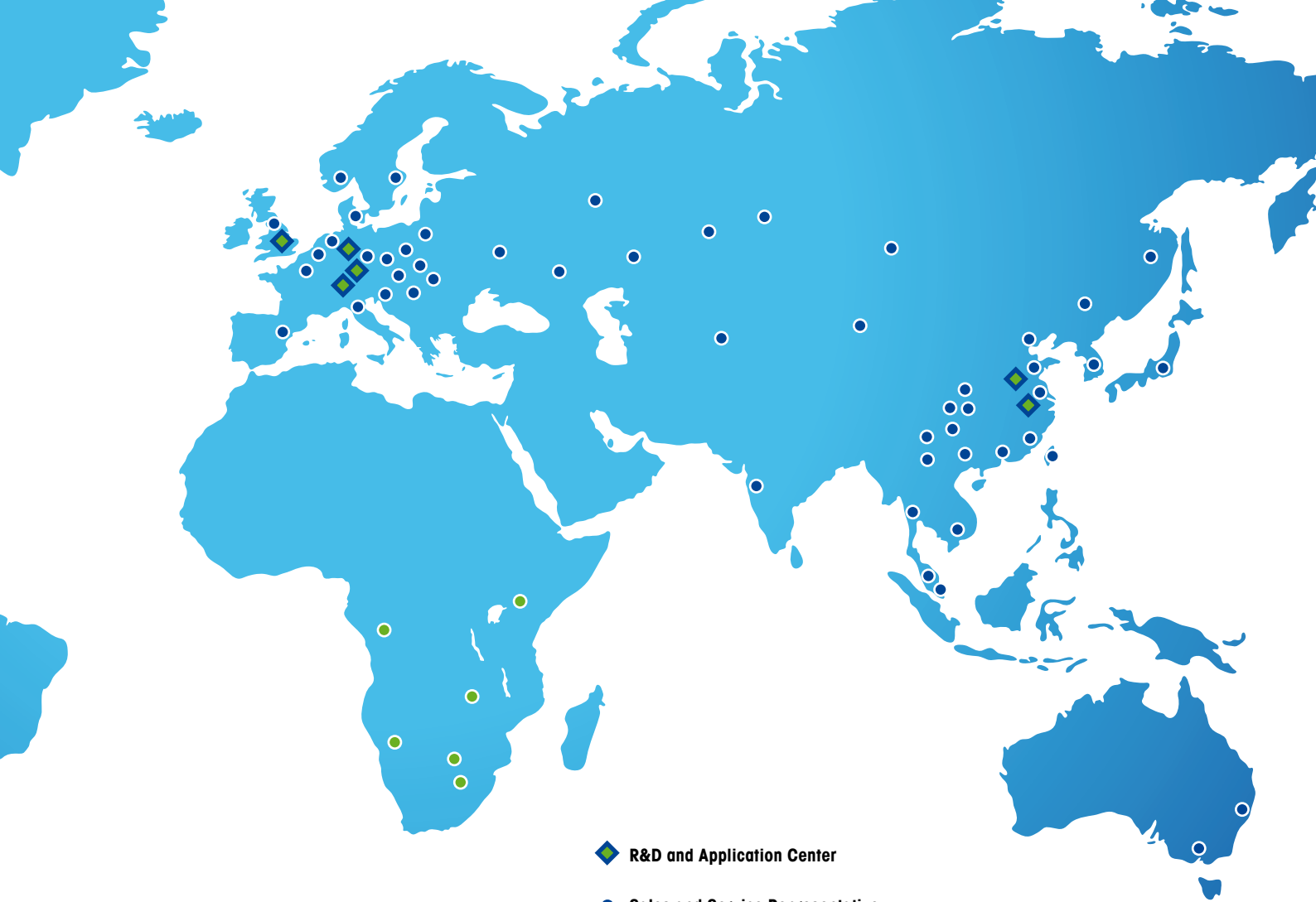
## Global Presence With Strong Solutions

**When it comes to instrumentation you need a powerful partner. One who has the strength and know-how in R&D to develop products that add true value to your processes. One who not only has a truly global presence to serve you even in the most remote global locations, but can provide you with application support and technical assistance, anytime and anywhere.**



### Large, Highly Experienced Support Force

We serve our customers worldwide with one of the largest sales and service networks in the industry. Over 5,000 factory-trained specialists in sales, application support and technical service are on-hand to assist you in increasing the efficiency, cost-effectiveness, safety and reliability of your operational processes. The local teams are able to maintain close relationships with users, they have the flexibility to adapt support and service in line with different user requirements.



◆ R&D and Application Center

● Sales and Service Representative

● Distribution & Service Partners

METTLER TOLEDO has its own Market Organizations in 35 countries and **Distribution & Service Partners** in further locations across the globe.

## Global Presence

With our own market organizations operating across 35 countries as well as selected partners, we are ready to serve customers right around the globe. Our products and services are available in over 100 countries. Our geographically focused market organizations are responsible for all aspects of sales, service and support.

Check our service offerings out  
 ► [www.mt.com/service](http://www.mt.com/service)



A service engineer of METTLER TOLEDO is upgrading a truck scales with POWERCELL® in Kiruna, Sweden

# Comprehensive Support from METTLER TOLEDO

## Visit our web-seminars for your convenient knowledge update

Our Webinars give you the opportunity to

- Obtain specific information about applications and products
- Learn about industry trends and standards
- Receive useful and informative presentations without added sales pressure

► [www.mt.com/webinars](http://www.mt.com/webinars)

## Check how certain your weighing is

Good Weighing Practice (GWP®) is an easy to follow guideline for handling scales and balances. With GWP® you can minimize measurement errors and achieve compliance easily.

► [www.mt.com/gwp](http://www.mt.com/gwp)

## Learn about the Good Titration Practice

Safe titration begins long before daily titration in the laboratory: selection of the right titration system, as well as professional installation and training, are the basis for titration without risk. Targeted maintenance and correct operation during everyday application guarantee reproducible results.

► [www.mt.com/gtp](http://www.mt.com/gtp)



[www.mt.com](http://www.mt.com)

For more information

**Mettler-Toledo AG**  
Laboratory Division  
CH-8606 Greifensee, Switzerland  
Tel. +41 44 944 22 11  
Fax +41 44 944 30 60

Subject to technical changes  
©07/2010 Mettler-Toledo AG  
Printed in Switzerland