

Laboratory Solutions

Laboratory Case Study



Highest Weighing Demands in Modern Gold and Silver Refinery

Argor-Heraeus

Gold & silver refinery

Fire assay

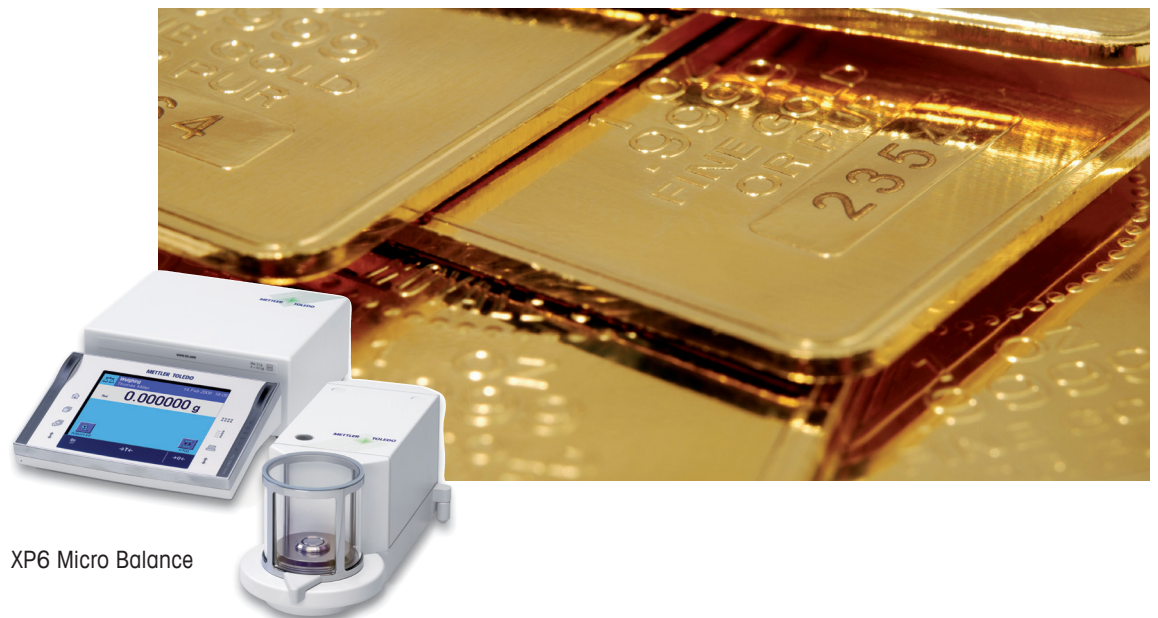
Check weighing



The Argor-Heraeus gold refinery processes precious metals and produces semi-finished components for distribution to the watch and jewelry industry. METTLER TOLEDO balances are used to ensure that the gold and silver content is checked and controlled with the highest possible accuracy throughout the entire refinery process.

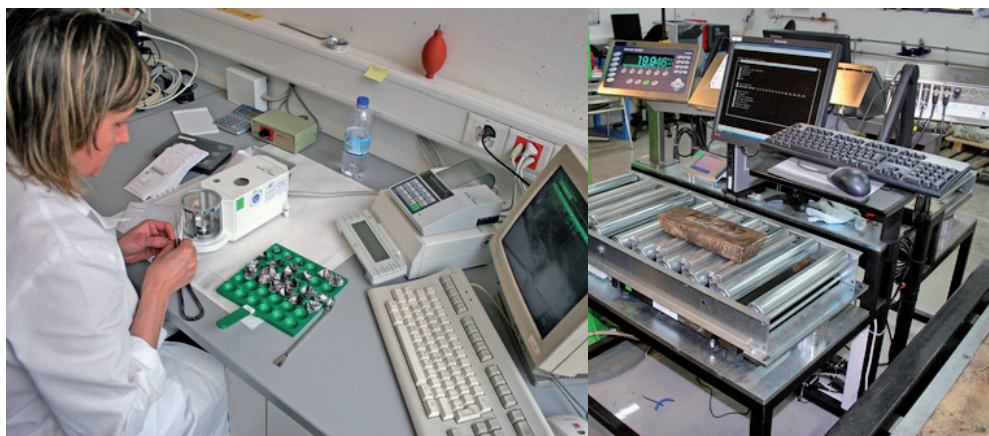
Accuracy is as precious as gold

"We already use the third generation of METTLER TOLEDO balances in our gold and silver refinery where the highest weighing accuracy and reliable results are essential," replied Lorenzo Medici, Manager SC Engineering at Argor-Heraeus, when asked about his experience with METTLER TOLEDO balances. The importance of weighing becomes immediately evident during the factory tour at Argor-Heraeus located in Mendrisio in the southern part of Switzerland. Precision weighing plays a crucial role in the most important process steps, such as for



XP6 Micro Balance

METTLER TOLEDO



Weighing-in of gold samples for fire assay method
Check weighing station for gold and silver bullion

incoming inspection, within the foundry and for refining and finishing steps. The weight is checked before and after each process step in order to closely monitor any weight differences.

Weighing as central role

All incoming raw gold and silver bullion is check weighed in order to determine the exact delivery weight. Depending on the bullion's weight, the goods are either checked on an Excellence XP64001L Precision Balance's large 64 kg capacity weighing platform or on a floor scale with a capacity of up to 1500 kg. Both balances are connected to a single display mounted on an extra stand next to the balances. This guarantees better result visibility and easier user handling. Thanks to this practical set up, the weight is determined quickly and accurately whilst avoiding reader errors.

After incoming inspection, the material undergoes further analysis and refining steps in order to prepare semi-finished parts for the jewelry

and watch industry and bullion with defined purity.

Finally, before the produced bullion or crafted parts leave the company, the weight is checked again. The bullion is carefully checked for nominal weight. If the weight falls below the accepted limit, the bullion goes back to the melting and processing stage, if it exceeds the upper limit, the weight is corrected to the nominal target tolerance. An Excellence Precision Balance with a readability of up to 1mg is used for this finishing step. The front glass of the draft shield was removed to provide easy access to the weighing pan, a benefit that could also be easily set up using the special 'Magic Cube' draft shield for precision balances.

From fire assay to the final product

One of the most impressive and yet age-old processes in gold refining is the so-called 'fire assay', a gravimetric method used to determine the purity of gold. This assay plays

an important role throughout the entire refining process from accepting raw materials through to the finished product.

Gold samples are accurately weighed on Excellence XP6 Micro Balances for the fire assay process then mixed with a defined amount of silver and wrapped in a lead foil. Each sample is then placed into a cupel and heated in a furnace at 1200 °C. The cupel, made of compressed magnesium oxide powder, absorbs the melted and oxidized base metals leaving a precious metal drop in the cupel. After solidification, the resulting bead is flattened to a thin plate and treated in a nitric acid bath to remove any silver. The resulting pure gold plate is subsequently re-weighed on the Micro Balance to determine the sample's fine gold content. Argor-Heraeus is highly satisfied with METTLER TOLEDO's Excellence XP6 Micro Balance as it generates fast yet accurate results, an important element for employees weighing so many samples per day.

Gold under full control

All data is recorded and fed into the IT system in order to closely monitor the flow of gold material. The balance's diverse connectivity options optimize the easy integration into the current ERP system and the printed reports, together with the data integration, ensure permanently traceable results ensuring the accountability of every gold sample.

► www.mt.com/XP-precision
► www.mt.com/micro

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