

Ensuring integrity in assaying practices



The cornerstone of Johnson Matthey's secondary metal refining service is the ability to predict consistently and fairly the precious metal content of materials sent by customers. This assessment is called assaying. The accuracy and honesty with which these assays are undertaken has been synonymous with Johnson Matthey since the company was first appointed Official Assayer to the Bank of England in 1852.

Johnson Matthey goes to great lengths to ensure that these standards are upheld in every assay made. Johnson Matthey ensures that all staff in the evaluation teams are appropriately qualified. Additional training in the analytical skills used is provided wherever necessary.

All UK laboratories used for assaying are certified by an external body, the United Kingdom Accreditation Service (UKAS). UKAS regularly audits laboratories and assesses the quality of record keeping and adherence to the recorded laboratory assaying technique. One example of this is in the measurement of weights, which is an essential part of the assay process. Every balance used in the analysis process is subject to a regular and rigorous maintenance and calibration schedule to ensure that all weights measured have a direct and certified link to the international standard weight measurement. Customers are often invited to visit the Johnson Matthey laboratories to assess for themselves the high standards applied.

Materials sent by customers to Johnson Matthey for refining are first thoroughly mixed to ensure a consistent concentration of precious metals throughout the material. Four samples are then taken for analysis. One sample is used by the Johnson Matthey analysis team, one sample is sent to the client, one sample is held for use by a third party assessment at an umpire laboratory and the final sample is held as a reserve in case of any disagreement in the assessment of precious metal content. The mixing and sampling processes are all open to review and inspection by customers or their representatives.

Umpire laboratories are used to settle differences in precious metal content in a very

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small proportion of cases (less than 1%). When this happens the Johnson Matthey assay is closer to the final agreed precious metal assay about 70% of the time.

A number of additional safeguards are in place to ensure the accuracy of Johnson Matthey assays. Many of the assay methods finish with analysis of the sample in a liquid form using instrumental techniques, eg. inductively coupled plasma (ICP) atomic emission spectroscopy. These techniques require liquids of known content (standards) to compare against the material for assay. To ensure the accuracy of these standards a scheme, impartially administered by an independent laboratory, compares measurements of similar standards from Johnson Matthey laboratories with other expert laboratories. The scheme checks both the accuracy of the standard and the methods used in its analysis. Usually agreement between laboratories is excellent and where small differences are observed these are subject to checking and corrective action. This encourages continuous improvements in the standards set by Johnson Matthey.

In order to add an extra safeguard to the accuracy of assays, throughout the material preparation stage in the laboratory, Johnson Matthey uses a range of standard reference materials. These materials are very similar to the material submitted for assay with the exception that they have a very well known assay. By comparison of the assay of the reference material with its known assay, the quality of the assay of the unknown material can be assured. For example if there were to be a significant difference between the assay of the reference material and its known content the assay would be declared invalid and the preparation process started again. Due to the lack of commercially available reference materials Johnson Matthey has a programme to produce new reference materials in partnership with the other expert laboratories in the field of precious metals assaying.