CHRYSOS CORPORATION

Assays at the speed of light

Work Instruction WI-023C

Preparation of Pulverised CRM Jars

Revision 1 – November 2024

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Revision History

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Related Documents

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Performance Note, PN-000 Chrysos PhotonAssay™ Service Summary

Performance Note, PN-001 Chrysos PhotonAssay™ measurement performance for PAAU02 Gold service

Performance Note, PN-002 Chrysos PhotonAssay™ measurement performance for PAAUAG02 Concurrent Gold and Silver service

Technical Note TN-403, Chrysos PhotonAssay™ Monitoring Standard Recommendations

Introduction

PhotonAssay™ is a fully automated and non-destructive technique for the rapid analysis of gold and other elements inside a bulk ore sample. Monitoring standards allow instrument performance and data quality to be observed. A number of CRMs are recommended for use as monitoring standards for PhotonAssay™, please see TN-403 for more information.

Data obtained from PhotonAssay™ relies on the accuracy of fill and mass measurements of the jars. This is particularly important for CRMs which are run for multiple cycles across an extended period, so it is imperative that any CRM monitoring standards used for an extended period maintain accurate values for these parameters. Discrepancies between registered fill (and mass) values and the actual values can lead to a bias in the reported results for that jar.

Each CRM jar must be filled (jarred) with sufficient material to maintain a fill level of 100% throughout its lifecycle, especially for jars of lightly-filled pulverised materials which can settle and/or self-compact over time. Chrysos recommends that the below procedure is followed for pulverised materials to mitigate the effect of settling and has developed recommended gross masses for commonly used pulverised materials.

Chrysos CRM jars are re-jarred periodically to prevent jar plastic material degradation which may cause material spillage and automation interruptions within PhotonAssay™ instruments. Clients should also re-jar their own CRM jars as necessary, with re-jarring recommended to be scheduled at regular intervals (e.g., monthly or quarterly) to pre-empt jar plastic material degradation. The status of registered CRM jars can be monitored via the Customer Daily Report with status 'Looming' indicating approaching cycle limit and 'Expired' indicating exceeding cycle limit. Re-jarring should also occur when CRM jars show signs of colour fading or brittleness.

Safety

Note that jarring of pulverised materials involves exposure to very fine particulates which may cause irritation of the airways and other health complications. Jarring should be carried out in a well-ventilated area, ideally within a HEPA-filtered extraction hood or powder transfer cabinet, and a respirator rated to the correct particle size for the material should be worn. Long-sleeve coverings, safety glasses and gloves should also be worn while following out this procedure. Consult your local regulations and the materials Safety Data Sheet.

Recommended Tools and Materials

Empty jar and lid	Mass balance
Chrysos funnel (tapered neck extension)	Spoon or scoop
Tamper	Brush
Blank reference disc (or other)	Dry rag or paper towel
Minimum mass reference list (see Chrysos Knowledge Base article; "Recommended CRM Masses")	

Jarring Procedure

a. Before beginning, confirm the mass balance is operational, level, and within its calibration period.
b. Ensure a side label is attached with a machine-readable barcode and the label displays the full name of the material (e.g., Rocklabs_SQ88, Oreas_229b).
c. Weigh the empty jar assembly, including lid/wadding/sponge/seal/etc. Record the empty jar mass and write this on the top of the lid.
d. To prevent the jar base from deforming when compacting material into the jar, place a blank Al reference disc, other Ti reference disc or custom support into the reference disc cavity at the base of the jar to be filled and keep it in place during filling.

e. To achieve a well filled jar, it is recommended to use a tamper (image below left) and a jar funnel (image below right) or equivalent tools to compact and evenly distribute the material within the jar. The jar funnel minimises material spillage during the filling and tamping process.

f. A CRM jar should be filled to maintain a 100% fill level throughout its lifecycle. Pulverised materials can settle and/or self-compact, resulting in reduced fill levels from their initial registered value, which may affect the accuracy of results. Chrysos has developed recommended gross masses for common materials, these recommended values are available in the Interact Knowledge Base. For other pulverised materials (including 3rd party materials) that are repeatedly assayed a target gross mass should be developed ensuring that the jar remains 100% full.

g. Using available tools, add CRM material to the empty jar, up to 1/3 full, and tamp/compress the material down firmly. Tap the jar on the bench firmly to assist with settling. Some working of finely pulverised material may be required to remove trapped air between particles. Care should be taken as some finely powdered materials may exhibit fluidised flow under pressure. When the material has been

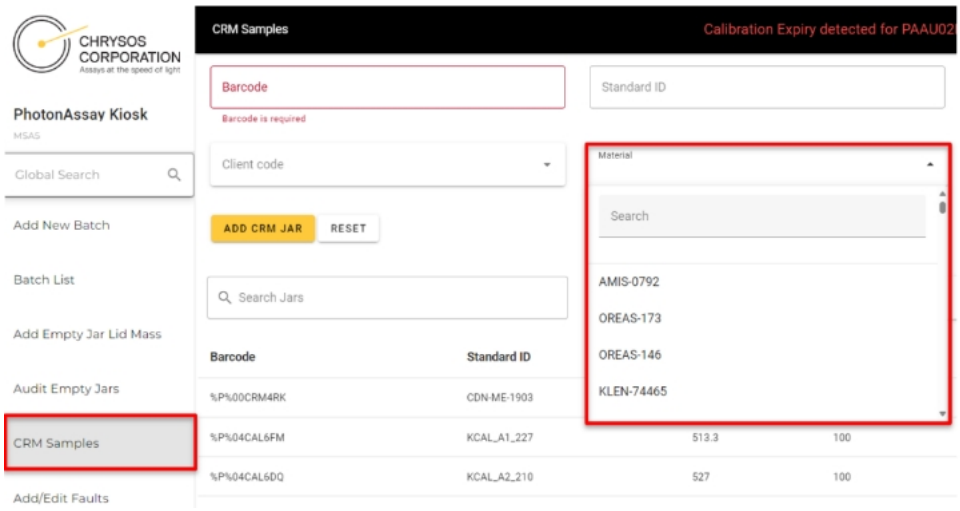
properly compressed it will stopped shifting under the tamper and feel more “solid”.

Continue adding and tamping the material in 3-4 tamped increments until it reaches the jar's brim. Ensure the material is packed tightly. Some tampers may have an indicator of the materials fill on the handle.

h. When full, remove the funnel/neck extender. Ensure the material is level with the lip of the jar and is packed flat with no gaps around the edges, such as in the images shown below. Brush any loose material from the jar lip and threads before replacing the lid. With the lid on, tap the jar on the bench firmly then remove the lid again to check for any further settling. If gaps have appeared around the jar edges, fill them in with additional material and further tamping.

i. Once filled, the jar should not have any evidence of bulging at the sides, or within the reference cavity slot at the bottom – this would indicate over filling.
j. Check that the gross mass is per the recommended gross mass for the material (if available). Mass values are available on Knowledge Base. If the gross mass is below the recommended gross mass, add more material to the jar and compress it firmly with the tamper ensuring the material does not sit above the top lip of the jar base. Re-weigh the jar.
k. If a recommended minimum mass does not exist for the material, ensure the jar is filled level and the material cannot be compressed further by firm tamping.

l. Clean any residual material from the tamper, jar funnel and work area to prevent carry-over contamination when switching to a different material. It is good practice to prepare jars in order of increasing concentration to minimise the risk of cross contamination.
m. Register the jar as a CRM jar within the OperatorUI on your PhotonAssay™ instrument.



All CRM jars will need to be registered on each instrument separately before they can be used as monitoring materials.

Re-jarring CRMs

a. The same process is followed as above except that the material is transferred from an existing jar. A top up of additional material may be required, so ensure this is available.
b. Ensure the side labels on new jars are consistent with the old jars.
c. Follow the jarring procedure above using the material retrieved from the old jar, topping up as necessary.
d. Register the new jar as per the above.