



Application Note AN-001

Recommended CRM Gross Masses – Pulverised Materials

Revision 2.0 – 2026-02-23

Executive Summary

Most CRMs used with PhotonAssay™ have been pulverised by the reference material producer to ensure material homogeneity. Over multiple repeated measurements pulverised material in PhotonAssay™ jars will tend to settle. Settled materials can be run for assay with a fill value that is not representative of the true state, leading to incorrect results. To avoid this, recommended gross mass ranges for CRMs commonly utilised with PhotonAssay™ systems have been developed and are listed within this document. Packing jars to the mass ranges identified herein should prevent the settling of pulverised materials over multiple assay cycles and provide consistent CRM performance.

Related Documents

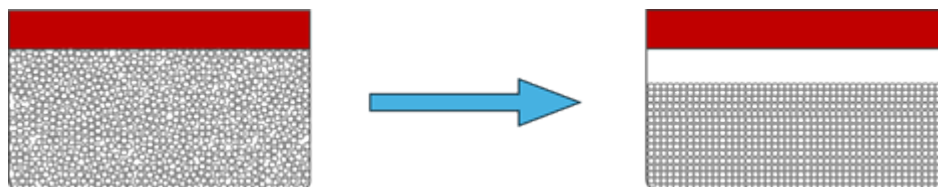
WI-023C - Preparation of Pulverised CRM Jars

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Background

When pulverised material is packed into a PhotonAssay™ (PA) jar for use as a CRM, in most cases it will initially be prepared to 100% full by the operator. However, as the jar undergoes sharp movements within the automation of the PA system, over multiple repeated measurements, the material will tend to settle. This will occur to varying degrees, depending on material density, grain size and initial compaction, but may result in fill changes of up to 20-30%.



In many cases the fill value was set at initial value (most of the time 100%) and is either

- a) not updated on subsequent use, or
- b) incorrectly measured as ~100% full by the Optical Fillometer (as the jar base has been scuffed by the PA automation system).

This can lead to a large discrepancy between the recorded jar fill and its actual fill level. The PA analysis depends on material position, so any fill mismatch can result in a measured grade which is biased compared to the certified value. Such bias can be significant.

To avoid the situation where pulverised material self-compacts and registered fill is no longer reflective of the actual fill, Chrysos has determined recommended masses for commonly utilised CRMs. Jars packed to a gross mass within the range should no longer settle and should remain 100% full over multiple PA cycles.

To reach the recommended masses provided, the pulverised material needs to be compacted using a set of tamping tools (generally a funnel and tamper) which Chrysos can provide, or alternatives may be sourced elsewhere. Instruction on the use of these tools is provided in WI-023C - 'Preparation of Pulverised CRM Jars', while a tutorial video may be found on the Customer Knowledge Base.

Notes

- Gross mass is a reference to the mass of the entire jar assembly, including jar base, jar lid and contents. Value ranges in section 2.1 were developed using a ~40g empty jar mass but should be achievable for any jar-lid combination.
- The tamping process described here has been developed to prevent the settling of monitoring materials undergoing multiple repeat cycles through the unit. Regular samples for assay should not be jarred using the tamper.
- For materials listed in section 2.1 (those with verified mass ranges), CRM jars should also not be overpacked. If jars exceed the upper mass range by a significant margin, a bias may result.
- Materials listed in section 2.2 ('indicative' mass ranges) have recommended values that are an estimate of the mass at which the material will exhibit a reduced propensity for settling (indicated by " ± 15 g"). It is not unexpected that the 100% full tamped mass will exceed this range, and jars should be prepared to be 100% full as a first priority for these materials.
- If reaching the recommended mass for a material is proving difficult, the density of the material can be increased by increasing the number of tamping iterations used to fill the jar (i.e., fill in smaller mass or fill % increments).
- Chrysos also utilises reference materials that are not pulverised (First Principles (FP) materials, glass frit, silica sand, liquid solutions, aggregate, etc.). These materials are not significantly affected by self-compacting issues and should not be tamped.

Recommended gross mass ranges

Materials with a verified range

These mass ranges were developed by preparing jars using the tamping procedure.

Material	Gross Mass (g)
AMIS 0566	560-590
AMIS 0872	505-535
CDN-ME-1903	540-580
CDN-ME-2001	615-645
CDN-ME-2105	525-555
CDN-ME-2314	490-520
CDN-SS-2204	495-525
CDN-SS-2205	490-520
CDN-SS-2206	495-525
Geostats G319-9	565-595
KLEN 74358	520-550
KLEN 74465	490-520
KLEN 74589	490-520
OREAS 211	460-510
OREAS 211b	500-540
OREAS 230	520-550
OREAS 230b	530-560
OREAS 232b	505-535
OREAS 233	480-530
OREAS 233b	500-530
OREAS 234	510-540
OREAS 234b	505-535
OREAS 236b	555-585
OREAS 237b	470-500
OREAS 238b	470-500
OREAS 239b	455-485
OREAS 240	475-525
OREAS 240b	475-505
OREAS 241	475-505
OREAS 241b	530-560
OREAS 242	490-520
OREAS 242b	520-550
OREAS 243	495-520
OREAS 245	425-455
OREAS 247	380-410

OREAS 247b	395-435
OREAS 249	390-420
OREAS 250c	505-535
OREAS 251c	495-525
OREAS 253b	490-520
OREAS 254c	470-500
OREAS 257b	370-400
OREAS 262b	470-500
OREAS 263b	490-520
OREAS 264b	520-550
OREAS 267	440-470
OREAS 268	460-490
OREAS 273	375-405
OREAS 274	525-555
OREAS 277b	500-530
OREAS 278b	495-525
OREAS 279b	500-530
OREAS 281	450-480
OREAS 282	395-425
OREAS 282b	445-475
OREAS 287	445-475
OREAS 289	440-470
OREAS 290b	450-480
OREAS 291b	440-470
OREAS 299	405-435
OREAS 460	495-525
OREAS 925	480-510
OREAS 926	470-500
OREAS 928	485-515
OREAS 929	490-520
OREAS 991	525-565
ROCKLABS HiSiIP5	490-520
ROCKLABS OxQ153	525-550
ROCKLABS OxQ171	530-560
ROCKLABS OxD183	540-580
ROCKLABS OxE182	525-555
ROCKLABS OxH178	525-555
ROCKLABS SE125	530-560
ROCKLABS SP132	520-555
ROCKLABS SQ71	550-585
ROCKLABS SQ130	550-590

Materials with an indicative range

These values are indicative and may be subject to change. Jars should be prepared to remain 100% full as the first priority.

Material	Gross Mass (g)
AMIS 0724	440±20
AMIS 0880	435±15
CDN-ME-1411	580±20
Gannet ST484	560±20
Gannet ST588	560±20
Gannet ST620	550±20
Gannet ST643	550±20
GEOSTATS G320-1	560±15
KLEN 74282	490±20
KLEN 76905	510±20
OREAS 13b	525±15
OREAS 228b	410±15
OREAS 229b	445±15
OREAS 231b	505±15
OREAS 235b	465±15
OREAS 236	490±20
OREAS 237	490±20
OREAS 250c	475±15
OREAS 251b	490±20
OREAS 252c	485±15
OREAS 254b	465±15
OREAS 255b	460±15
OREAS 255c	455±15
OREAS 263b	450±15
OREAS 264	410±15
OREAS 266	475±15
OREAS 277	445±15
OREAS 284	470±15
OREAS 285	460±15
OREAS 286	455±15
OREAS 288	470±15
OREAS 602	400±20
OREAS 602b	400±20
OREAS 605b	380±20
OREAS 60D	370±15
OREAS 622	450±20
OREAS 624	420±20
OREAS 924	450±20

OREAS 927	460±20
OREAS 932	515±15
OREAS 934	395±15
OREAS 935	410±15
OREAS 993	510±15
ROCKLABS HiSiIP3	470±15
ROCKLABS OxD127	485±15
ROCKLABS OxD151	420±15
ROCKLABS OxD167	545±15
ROCKLABS OxE166	540±20
ROCKLABS SF100	465±15
ROCKLABS SF85	465±15
ROCKLABS SJ138	540±15
ROCKLABS SP72	515±15
ROCKLABS SQ88	490±15