



Australian Government

Assessment Requirements for MSL973023

Perform fire pouring techniques

Release: 1

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Modification History

Release	Comments
Release 1	This version was released in <i>MSL Laboratory Operations Training Package Release 2.0</i>. Supersedes and equivalent to MSL973011 Perform fire pouring techniques. Foundation skill information added. Range of conditions removed. Assessment requirements amended.

Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, and:

- safely and effectively extracted precious metals from the host matrices in readiness for analysis on at least 3 occasions, including:
 - maintaining close attention to technical and safety requirements in a physically demanding, hazardous environment
 - recognising common sample preparation and cupellation problems and making standard adjustments to fluxes and firings
 - recognising non-acceptable characteristics of received and fused samples, buttons and prills
 - recognising indicators of poor recovery and applying established corrective actions.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- workplace procedures and/or standard methods for:
 - fusion of common mineral ore samples
 - cupellation of buttons
 - digestion/parting of prills
 - specific samples, sites and clients (labelling, preparation, storage, transport and disposal)
 - published preparation methods
 - recording and reporting
 - waste minimisation and safe disposal
- common samples:

- solids, such as rocks, minerals, soils, sands and stream sediments
- core and other drill samples (e.g. rotary air blast (RAB), reverse circulation (RC) and aircore)
- slurries, powder concentrates and metallurgical solutions
- dump samples and grab samples
- sequencing of pots in a rack:
 - addition of silver wire or silver nitrate (AgNO_3) mix
 - addition of coloured salts (e.g. copper sulphate CuSO_4)
- separation of collectors:
 - cupellation; digestion; and/or parting, annealing and weighing for a gravimetric finish
- function, operation and maintenance of assay equipment used in job role
- typical hazards
- criteria for an 'acceptable' button, including:
 - one piece, mass >20 g and <50 g
 - malleable
 - separates cleanly from slag
 - free of undecomposed ore, matte and speiss
- causes of contamination and losses, including:
 - poorly made cupels
 - base metals – copper (Cu), nickel (Ni), zinc (Zn) and bismuth (Bi)
 - arsenic (As), sulphur (S), antimony (Sb), selenium (Se), tellurium (Te) and chromium (Cr)
 - scoria
 - sprouting
- indicators of potential loss and the corrective action, including:
 - viscous slag (check furnace temperature, adjust flux and lower charge weight)
 - lead shotting – (adjust flux, lower charge weight to compensate for high oxides, silicates and chromites)
 - sulphides (adjust fusion time, adjust sample weight and/or flux)
 - matte, speiss (adjust sample weight and flux)
 - incomplete fusion (adjust sample weight and/or flux)
 - unacceptable button (adjust sample weight and/or flux)
 - inquartation (add three parts silver (Ag) to prill, wrap in lead foil and re-cupel)
- workplace and legal traceability requirements
- awareness of environmental sustainability issues as they relate to the work task
- legal, ethical and work health and safety (WHS) requirements specific to the work task.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - a variety of precious metal ore samples and associated fire assay methods, fire assay materials and reagents
 - client requests and documentation: client profile, sample identification, sample receipt, storage and analyses, required preparation method and service charges
 - assay equipment, such as:
 - mixing equipment and balances
 - fusion and muffle furnaces and associated spares
 - temperature sensors and hotplates
 - compressed air service, extraction systems and fuel supply lines
 - cupels, pouring equipment, pot loader, trolleys, moulds, tongs and hammers
 - pots, including ceramic, acidic/basic, alumina, zirconia and graphite
 - collectors, including litharge or lead (II) oxide (PbO) for pot fusion and silver (AgNO₃) for the cupellation
 - fluxes
 - non-standard flux additives
 - safety equipment and safe work procedures.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

MSL Laboratory Operations Companion Volume Implementation Guide is available from VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>