Australian Government

Assessment Requirements for MSL973011
Perform fire pouring techniques

Release: 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

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Modification History

Release 1. Supersedes and is equivalent to MSL973011A Perform fire pouring techniques

Performance Evidence

Evidence of competence in this unit must satisfy all of the requirements of the elements and performance criteria, and include demonstration of:

- safely extracting precious metals from their host matrices in readiness for analysis on at least three (3) occasions
- interpreting and following standard recovery methods
- 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
- recognising the presence of highly oxidised ores, such as haematite or magnetite, and adjusting the charge weight and flux components to suit
- accurately weighing samples and flux components
- manually handling heavy and hot items of equipment safely
- maintaining sequential control of samples through all recovery stages
- keeping accurate and complete records, including:
  - pour sheets (date, time, client, pour number and preparation method)
  - number of pots, positions of sample, blank and check in rack
  - visual appearance of samples, buttons and prills
  - corrective actions for specific samples
- planning work flow to ensure efficient sample throughput
- minimising re-work, waste and environmental impacts and disposing of all waste responsibly
- recognising hazards and using workplace safety procedures and safety equipment to work safely at all times.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- procedures and/or standard methods for:
  - fusion of common mineral ore samples
  - cupellation of buttons
  - digestion/parting of prills
- function, operation and maintenance of assay equipment used in job role
- 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
- relevant hazards and control measures, operation and maintenance of safety equipment, work health and safety (WHS) and environment requirements.

Assessment Conditions

- Judgement of competence must be based on holistic assessment of the evidence. Assessment methods must confirm consistency of performance over time, rather than a single assessment event.
- This unit of competency is to be assessed in the workplace or a simulated workplace environment. A simulated workplace environment must reflect realistic operational workplace conditions that cover all aspects of workplace performance, including the environment, task skills, task management skills, contingency management skills and job role environment skills.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept in each case).
- This unit of competency may be assessed with:
  - MSL953001 Receive and prepare samples for testing
  - MSL943002 Participate in laboratory or field workplace safety
- Holistic assessment methods include:
  - review of quality control performance and analytical results traceable to assay samples prepared by the candidate
  - review of sample records prepared by the candidate
  - feedback from supervisors, peers and/or clients about the candidate's ability to provide acceptable buttons and prills and troubleshoot and correct common recovery failures
  - written/oral questions about fire pouring techniques, typical recovery problems and corrective actions.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
  - a variety of precious metal ore samples and associated fire assay methods, fire assay materials and reagents
  - client requests and documentation, such as 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, including:
  - bulk fluxes containing lead (II) oxide (PbO), borax, soda ash, silica, silver nitrate and flour
  - non-standard flux additives, such as:

    - flour (oxidising samples)
    - potassium nitrate (reducing samples and sulphides)
    - silica (basic ores)
    - lead as PbO (siliceous ores)
- safety equipment and safe work procedures.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- The assessor must demonstrate both technical competence and currency.
- Technical competence can be demonstrated through:
    - relevant VET or other qualification/Statement of Attainment AND/OR
    - relevant workplace experience.
- Currency can be demonstrated through:
    - performing the competency being assessed as part of current employment OR
    - having consulted with a laboratory about performing the competency being assessed within the last twelve months.

Links

MSA Training Package Implementation Guides - http://mskills.org.au/training-packages/info/