Australian Government

Assessment Requirements for MSL954005 Prepare mineral samples for analysis

Release: 1

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Modification History

Release	Comments
Release 1	This version was released in *MSL Laboratory Operations Training Package Release 2.0*. Supersedes and equivalent to MSL954002 Prepare mineral samples for analysis. 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 reduced at least 3 types of mineral samples to representative samples and prepared analytical portions of each that meet client requirements. Portions must be:
  - representative
  - free of contamination
  - of specified quantity and particle size
  - ready for analysis.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- geological properties of samples used in job role, including sulphides, oxides and silicates
- typical materials sampled include:
  - solids, such as rocks, minerals, soils, sands and stream sediments
  - pulverised core and other drill samples, such as rotary air blast (RAB), reverse circulation (RC) and aircore samples
  - powder concentrates
  - dump samples and grab samples
- sample preparation methods:
  - sorting, boxing and drying
  - sieving
  - primary crushing (e.g. 10 mm, 2 mm)
  - fine pulverising (e.g. 100 micron, 75 micron)

  - partial digestion requiring separation (e.g. aqua regia)
  - complete digestion (e.g. multi-acid digest)
  - non-destructive (e.g. LIF, Li2B4O7 disks)
- critical preparation steps that determine analytical accuracy and precision, including:
  - monitoring drying (incipient and total)
  - mixing to ensure homogeneity before sub-sampling
  - suitability of reagents for purpose (e.g. dryness)
  - accurate operation of dispensers and balances
  - critical/non-critical volumes and critical reagent quantities
  - temperature control during digests
  - loss of solution prior to/after mixing
  - type and acid strength in final solutions
  - mechanical loss of digest (sputtering, residues on glassware/plastic ware and filtering)
- terminology, including homogeneous, heterogeneous, integrity and segregation
- distribution of common analytes in a matrix
- chemical reactions associated with common preparation methods used in job role
- effects of reagents on the element of interest
- reaction and recovery rates, solubility and equilibria
- tracking analytes of interest during changes of state
- function of key components and operating procedures for sample preparation equipment
- calculation steps in preparation methods (e.g. serial dilution)
- use of non-international system of units (SI) units (ppm, ppb) and SI units, and conversions
- relevant hazards, work health and safety (WHS) and environmental requirements, including use of safety data sheets (SDS) and antidotes for specific hazards, including hydrofluoric acid and cyanide
- workplace and/or legal traceability requirements
- awareness of environmental sustainability issues as they relate to the work task
- legal and ethical 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 mineral samples, sample preparation methods, reagents, sample containers and labels
  - client requests/documentation
  - sample preparation equipment including splitters, mills, bowls and tumblers, crushers, grinders and disc pulverisers, sieves, ovens and muffle furnaces

- laboratory equipment: ultrasonic baths, centrifuges and vacuum and pressure filtration, volumetric glassware/plastic ware and dispensers, analytical balances and auto-samplers
- 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