



Australian Government

Department of Education, Employment and Workplace Relations

MSL954001A Obtain representative samples in accordance with sampling plan

Revision Number: 1

MSL954001A Obtain representative samples in accordance with sampling plan

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to obtain a range of samples that are representative of the source material (e.g. raw ingredients, product in process and final product) and to prepare the samples for testing. All sampling activities are conducted in accordance with a defined sampling plan. This unit does not cover the subsequent testing of the samples.
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Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians in all industry sectors. It involves: • a range of sampling plans, samples and sampling procedures, which apply to the enterprise site, plant laboratory or field sites • enterprise products/materials and hazardous materials • a range of sampling points and/locations. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for sampling	1.1. Confirm the sampling location, number and type of samples, and timing and frequency of sampling from enterprise or client's sampling plan 1.2. Liaise with relevant personnel to arrange site access and, if appropriate, all necessary clearances and/or permits 1.3. Select sampling equipment and conditions to achieve representative samples and preserve sample integrity during collection, storage and transit 1.4. Check that all procedures are in accordance with client or enterprise requirements, relevant standards and codes 1.5. Identify site and sampling hazards and review enterprise safety procedures 1.6. Assemble and check all sampling equipment, materials, containers and safety equipment 1.7. Arrange suitable transport to, from and around site as required
2. Conduct sampling and log samples	2.1. Locate sampling sites and, if required, services at the site 2.2. Conduct representative sampling in accordance with sampling plan and defined procedures 2.3. Record all information and label samples in accordance with traceability requirements 2.4. Record environment or production conditions and any atypical observations made during sampling that may impact on sample representativeness or integrity 2.5. Transport all samples back to base according to standard operating procedures (SOPs) and relevant codes
3. Prepare samples for testing	3.1. Prepare sub-samples and back-up sub-samples that are representative of the source 3.2. Label all sub-samples to ensure traceability and store in accordance with SOPs 3.3. Follow defined preparation and safety procedures to limit hazard or contamination to samples, self, work area and environment 3.4. Distribute sub-samples to defined work stations maintaining sample integrity and traceability requirements
4. Address client issues	4.1. Enter approved information into laboratory information management system (LIMS) 4.2. Report all relevant aspects of the sampling and

ELEMENT	PERFORMANCE CRITERIA
	preparation phases in accordance with enterprise procedures 4.3. Ensure that information provided to client is accurate, relevant and authorised for release 4.4. Maintain security and confidentiality of all client/enterprise data and information
5. Maintain a safe work environment	5.1. Clean all equipment, containers, work area and vehicles according to enterprise procedures 5.2. Check serviceability of all equipment before storage 5.3. Use defined safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 5.4. Minimise the generation of wastes and environment impacts 5.5. Ensure the safe collection of all hazardous wastes for appropriate disposal

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- collecting representative samples in accordance with a sampling plan
- techniques to preserve the integrity of samples
- identifying atypical materials and samples and taking appropriate action
- maintaining sampling equipment
- completing sampling records
- working safely
- following requirements for the disposal of waste and the preservation of the environment

Required knowledge

Required knowledge includes:

- principles of representative samples
- principles and procedures for random, systematic and stratified sampling, consistency of sampling procedures
- preservation of the integrity of samples
- maintaining identification of samples relative to their source
- enterprise and/or legal traceability requirements
- cost effectiveness of sampling
- characteristics of product/material to be sampled and likely contaminants
- links between quality control, quality assurance, quality management systems and sampling procedures
- enterprise procedures dealing with legislative requirements for the handling, labelling and transport of hazardous goods
- links between correct occupational health and safety (OHS) procedures and personal and environmental safety particularly at high risk sites

Specific industry

Additional knowledge requirements may apply for different industry sectors. For example: Biomedical and environmental services:

- specific legislation on biohazards
- documentation procedures for the chain of custody for samples to be used as evidence or for blood transfusion

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors should ensure that candidates can:

- collect the specified quantity of sample to enable all processing and testing to occur and back-up samples to be stored
- obtain a sample that is representative of the bulk material
- preserve the integrity of samples by closely adhering to procedures
- label samples and sub-samples to satisfy enterprise/legal traceability requirements
- identify atypical materials and samples and take appropriate action
- maintain sampling equipment in appropriate condition
- complete sampling records using enterprise procedures
- follow safety regulations and enterprise OHS procedures during sampling, transport and storage
- follow relevant legislative requirements for the disposal of waste and the preservation of the environment.

Context of and specific resources for assessment

This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with:

- *MSL924001A Process and interpret data*
- *MSL943002A Participate in laboratory/field workplace safety*
- *relevant MSAL974000 series units of competency*
- *relevant MSAL975000 series units of competency relevant to the sampling.*

Resources may include:

- variety of sample types
- sampling plans
- a selection of sampling containers and sampling

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	equipment.
Method of assessment	The following assessment methods are suggested: • inspection of samples collected by the candidate • review of sampling documentation completed by the candidate • feedback from peers, customers and supervisors that sampling plans were followed • questioning to assess underpinning knowledge of representative sampling procedures • observation of the candidate taking a range of samples. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. Manufacturing A metallurgical laboratory technician is very familiar with preparing representative samples for a range of final products in a steelmaking plant. One day, he/she is asked to sample a 50 tonne small-particle coal delivery which is believed to have a higher than acceptable sulphur content. Having never prepared representative samples for such a large quantity of material, the technician consulted their supervisor and developed an appropriate sampling plan. The technician arranged for the operator of a small front-end loader to take buckets of coal from five equally spaced points around the pile. The resulting material was then combined and mixed in one heap. The technician coned and quartered the heap enough times to

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obtain a representative sample of about 5kg. He/she arranged for the unwanted material to be returned to the stockpile. On return to the laboratory, the technician crushed the sample and repeatedly coned and quartered the material to obtain an analytical portion.

Environmental

A field technician trained in sampling natural water systems is asked to sample a bright yellow industrial wastewater discharge into a small creek. The relevant sampling plan specifies that the samples should be collected where the waste water is well mixed near the centre of the creek and at the mid-depth point. The technician also notes that the samples must be collected where turbulence is at a maximum so that the settling of solids is minimal. On arrival at the site, the technician locates where the wastewater is entering the creek. He/she moves downstream to where the waste water and creek water is well mixed and there is little apparent loss of the yellow suspended solids. The technician dons the required personal protective equipment and uses a convenient bridge to collect a set of six samples and duplicates over a half-hour period using the equipment and procedures specified in the sampling plan. Using a field notebook, the technician records all information specified in the laboratory's chain of custody requirements and safety plan for handling potentially hazardous industrial waste.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Codes of practice

Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, codes, procedures and/or enterprise requirements

Standards, codes, procedures and/or enterprise requirements may include:

- Australian and international standards, such as:
 - AS 1199 Sampling procedures and tables for inspection by attributes
 - AS 1678 Emergency procedure guide - Transport
 - AS 1940-2004 Storage and handling of flammable and combustible liquids
 - AS 3780-2008 The storage and handling of corrosive substances
 - AS 4433.2-1997 Guide to the sampling of particulate materials - Preparation of samples
 - AS/NZS 4452:1997 The storage and handling of toxic substances
- American Association of Cereal Chemists (AACC) Approved Methods of Analysis
- Australian Dangerous Goods Code
- enterprise and/or client sampling schemes and sampling plans
- enterprise recording and reporting procedures
- gene technology regulations
- material safety data sheets (MSDS)
- methods and procedures which may be written to meet enterprise, client and/or regulatory/certifying body requirements
- National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)]
- site plans, maps and specifications

RANGE STATEMENT	
Basic principles of sampling	Basic principles of sampling include: • representative samples • preservation of integrity of samples • maintaining identification of samples relative to their source, enterprise and legal traceability • cost-effectiveness of sampling • consistency of sampling procedures • sampling principles, including random, systematic and stratified sampling
Materials sampled	Materials sampled may include: • gas or air samples • liquid samples, such as water, groundwater, waste water, stormwater, sludges and sewage • solid samples, such as soil, sediments, rocks, concrete, quarry and mining material • solid wastes • raw materials, start, middle, end of production run samples, final products and materials used in production processes, such as flocculants • plants • animals • microbiological samples
Types of samples	Types of samples may include: • grab samples • composite samples • quality control samples • research or one-off samples • environmental or survey samples
Sampling tools and equipment	Sampling tools and equipment may include: • shovels, augers and chain saws • sampling frames, sampling tubes, dip tubes, spears, flexible bladders and syringes • front-end loader, backhoe, excavator and drill rig • sample bottles or containers, plastic containers and disposable buckets • access valves • sample thief • auto samplers

RANGE STATEMENT	
	• pumps and stainless steel bailers • traps and cages • sterile containers, pipettes, inoculating loops and disposable spoons

RANGE STATEMENT	
Maintenance of integrity of samples	Maintenance of integrity of samples may include: • use of compatible container, such as glass, plastic, amber and opaque bottles • use of appropriate preservatives, such as sodium azide, toluene or antibiotics • decontamination of sampling tools between collection of consecutive samples • wrapping container in foil • purging of sample lines and boxes • handling and transport to avoid disturbance or damage • temperature control which may involve insulation of sample without direct contact with the coolant • wrapping in wet newspaper, cloth, sand or sawdust • transfer of sterile sample into sterile container • monitoring of storage conditions
Site and sampling hazards	Site and sampling hazards may include: • solar radiation, dust and noise • wildlife, such as snakes, spiders and domestic animals • biohazards, such as micro-organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • chemicals, such as acids and hydrocarbons • aerosols • sharps and broken glassware • manual handling of heavy sample bags and containers • crushing, entanglement and cuts associated with moving machinery and hand tools • vehicular and pedestrian traffic
Safety procedures	Safety procedures may include: • use of MSDS • use of personal protective equipment, such as hard hats, hearing protection, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots

RANGE STATEMENT	
	• use of biohazard containers and laminar flow cabinets • correct labelling of reagents and hazardous materials • handling, and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontaminating equipment and work areas • machinery guards • signage, barriers, service isolation tags, traffic control and flashing lights • lockout and tag-out procedures
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Sampling
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		