



Australian Government

MSL955001 Supervise a robotic sample preparation system

Release: 1

MSL955001 Supervise a robotic sample preparation system

Modification History

Release 1. Supersedes and is equivalent to MSL955001A Supervise a robotic sample preparation system

Application

This unit of competency covers the ability to ensure that a workplace's robotic sample preparation system operates safely and continuously to provide clients with samples that meet their specifications. This includes prioritising and planning job sequences, solving common system problems as they arise and working closely with system operators to ensure safety and achievement of production targets and quality standards. Personnel are not expected to undertake system repairs, servicing or non-routine cleaning and maintenance.

This unit of competency is applicable to laboratory supervisors in charge of robotic sample preparation systems in the mining industry sector. Robotic sample preparation systems are used where there are high volumes of material and/or there is a need to minimise the operator's contact with potentially hazardous materials. Therefore, this unit of competency may also be relevant for some laboratories in the construction materials testing and manufacturing sectors.

While no specific licensing or certification requirements apply to this unit at the time of publication, laboratory operations are governed by relevant legislation, regulations and/or external accreditation requirements. Local requirements should be checked.

Pre-requisite Unit

MSL953002 Operate a robotic sample preparation system

Competency Field

Sampling

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|----------------------|-----|--|
| 1 | Plan work for | 1.1 | Review job requests to determine nature of samples, required parameters and any specific client instructions |
|---|----------------------|-----|--|

	shift		or preparation methods for each
		1.2	Assess hazards associated with samples and identify the need for specific safety equipment and safe work procedures
		1.3	Determine job sequence after consideration of the dryness of samples, need for further drying or pre-treatment and client/production priorities
		1.4	Record job sequence and confirm details with operators
2	Oversee system set-up	2.1	Check that data entry for samples is complete, accurate and matches accompanying documentation
		2.2	Check that sample preparation parameters assigned to each sample are appropriate and adjust as necessary
		2.3	Conduct pre-use system checks, make necessary system adjustments and authorise start-up
3	Monitor system performance and recover from errors and breakdowns	3.1	Conduct regular system checks to determine whether system outputs are consistent with normal operation
		3.2	Conduct regular visual checks to identify signs of malfunction, equipment wear or impending system failure
		3.3	Interpret error codes and analyse system/equipment outputs to investigate the nature of problems
		3.4	Shut down and/or isolate faulty system components to enable safe investigation and continuation of unaffected work tasks
		3.5	Troubleshoot causes of common system problems and take appropriate corrective actions within scope of responsibility and technical competence
		3.6	Seek advice when problems are beyond scope of responsibility or knowledge
		3.7	Arrange for servicing and/or repairs in response to mechanical breakdowns
		3.8	Prior to re-start, conduct pre-use checks, adjust job

			sequence and sample preparation parameters and re-synchronise system components as necessary
4	Maintain system safety	4.1	Ensure operators know about sample and system hazards, required safe work procedures and use of safety/personal protective equipment (PPE)
		4.2	Ensure that safety equipment and required PPE is available and fit for purpose
		4.3	Conduct regular checks to ensure that operators work safely when handling hazardous samples, operating the system and performing authorised cleaning/maintenance of system components
5	Maintain system records	5.1	Ensure that the data, results and comments entered by operators into system are complete and accurate for each shift
		5.2	Maintain the security, integrity and traceability of samples and system documentation
		5.3	Record and report system/equipment use, errors, breakdowns, maintenance and repairs in accordance with workplace procedures
6	Contribute to system improvements	6.1	Identify and report opportunities to improve system safety to appropriate personnel
		6.2	Examine system logs and outputs to identify instances or emerging trends of sub-standard performance
		6.3	Recommend appropriate preventative/corrective actions for improving performance to relevant personnel
		6.4	Implement authorised system improvements
		6.5	Train operators to improve performance and minimise recurrence of preventable problems

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Standards, codes, procedures and/or workplace requirements

Standards, codes, procedures and/or workplace requirements include the latest version of one or more of:

- Australian and international standards covering the requirements for the competence of testing and calibration laboratories; laboratory safety; quality and environmental management; industrial robot systems; sampling of specific ores and particulate materials; and labelling, storage, handling and transport of hazardous materials
- national work health and safety (WHS) standards and codes of practice, national environmental protection measures, and national measurement regulations and guidelines
- specific codes, guidelines and procedures, such as National Association of Testing Authorities (NATA) accreditation requirements and principles of good laboratory practice (GLP)
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; maintenance schedules; material safety data sheets (MSDS); safety procedures; material, production and product specifications; production and laboratory schedules; workplace recording and reporting procedures; and waste minimisation and safe disposal procedures
- sampling procedures for specific samples, sites and clients (labelling, preparation, storage, transport and disposal)
- methods and procedures which may be written to meet workplace, client and/or regulatory/certifying body requirements

Materials sampled

Materials sampled include, but are not limited to, one or more of:

- 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

Sample preparation methods include one or more of:

- sorting, boxing and drying
- sieving
- milling
- primary crushing (e.g. 10 mm, 2 mm)
- fine pulverising (e.g. 100 micron, 75 micron)
- robotic system parameters, such as grind time, crushing time and cleaning cycles to prevent cross-contamination

Sample preparation equipment

Sample preparation equipment includes one or more of:

- splitters (e.g. riffles and rotary dividers)
- mills (e.g. ball, ring and rod)
- bowls (e.g. chrome-steel, tungsten-carbide and zirconia) and tumblers
- crushers (e.g. cone, jaw and roll), grinders and disc pulverisers
- sieves
- ovens
- sample containers and labels

Hazards

Hazards include, but are not limited to, one or more of:

- dust, silica and fibrous materials
- asbestiform minerals
- naturally occurring radioactive materials (NORM)
- samples containing nickel and lead-based compounds
- noise and vibration
- crushing, entanglement and cuts associated with moving machinery
- impact injuries from contact with robot arms
- failure of pneumatic hoses
- manual handling of heavy loads, such as sample bags/containers, racks and trolleys
- heat exhaustion/stress and fatigue

Safe work practices

Safe work practices include, but are not limited to, one or more of:

- ensuring access to service shut-off points
- recognising and observing hazard warnings and safety signs
- labelling of samples and hazardous materials

- extracting dust
- using cages and guards for moving machinery parts
- providing noise insulation
- following established manual handling procedures
- regularly cleaning equipment and work areas in accordance with workplace procedures
- reporting of abnormal emissions and airborne contaminants to appropriate personnel
- using PPE, such as masks, heat resistant mittens, boots, goggles, coats, ear muffs, safety boots and heat reflective clothing

Common system problems and appropriate corrective actions

Common system problems and corrective actions include one or more of:

- sample losses:
 - inspecting mill for mechanical problems and worn hoses
 - inspecting balance/load cell, clean and check calibration
 - checking sample for dryness and contamination
- collision of sample buckets, transport belt problem:
 - clearing obstruction, cross-checking sample, worksheet, job sequence and synchronising belt
- loss of air pressure:
 - checking pneumatic lines, compressor and solenoid valves
- laboratory information management system (LIMS) network connections:
 - checking all parameters are saved in system, if not, unloading and reloading data and cross-check samples with worksheets

WHS and environmental management requirements

WHS and environmental management requirements include:

- complying with WHS and environmental management requirements at all times, which may be imposed through state/territory or federal legislation. These requirements must not be compromised at any time
- applying standard precautions relating to the potentially hazardous nature of samples

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSL955001A Supervise a robotic sample preparation system

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for MSL955001 Supervise a robotic sample preparation system

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Performance Evidence

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

- ensuring that the robotic sample preparation system operates efficiently and safely to produce outputs that meet the workplace and/or client quality requirements on at least three (3) occasions
- prioritising and planning job sequences
- explaining system operation and safe work procedures to operators
- working closely with system operators to ensure safety and achievement of production targets and quality standards
- planning, monitoring and adjusting work flow to manage competing client/production priorities for a shift
- recognising and rectifying problems caused by prior sample handling and preparation
- recognising, assessing and controlling hazards associated with samples and the system
- interpreting system error codes and taking appropriate corrective actions
- troubleshooting and solving common system problems within scope of responsibility
- interpreting, applying and improving workplace procedures for operating robotic system
- communicating clearly with clients, operators, maintenance/IT technicians and production managers
- maintaining system records
- working safely at all times.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- procedures for sorting, receiving and analysing samples
- geological and chemical characteristics of mineral ores handled in job role
- sample preparation methods/processes for a the range of mineral ore samples handled in job role
- purpose and key steps in routine downstream analytical tests for samples handled in job role
- procedures for preventing contamination
- procedures for ensuring security, integrity and traceability of samples
- procedures for ensuring confidentiality of results

- function of key components and operating procedures for robotic sample preparation system
- function of key components of laboratory information management system (LIMS), system software and layout of screens
- common system problems and error codes for system errors, recommended preventative/corrective actions and breakdown procedures
- troubleshooting and problem-solving techniques relevant to job role
- importance of good customer relations, throughput, costs and minimising rework
- relevant hazards, control measures, and 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:
 - MSL944001 Maintain laboratory or field workplace safety
 - MSL977002 Troubleshoot equipment and/or production processes
- Holistic assessment methods include:
 - review of production logs, quality control, performance and analytical results traceable to samples prepared on shifts that were supervised by the candidate
 - review of system records prepared by the candidate
 - feedback from operators, service/maintenance technicians, clients and laboratory/production managers
 - oral or written questions to assess knowledge of robotic sample preparation procedures, common system problems and their specified corrective actions.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - a robotic sample preparation system
 - mineral ore samples, sample preparation methods, equipment and reagents

- client requests/documentation, such as client profile; sample identification and sample receipts; required preparation methods, storage and analyses; and service charges
- safety equipment
- workplace 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.

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