



Australian Government

MSL973007 Perform microscopic examination

Release: 1

MSL973007 Perform microscopic examination

Modification History

Release 1. Supersedes and is equivalent to MSL973007A Perform microscopic examination

Application

This unit of competency covers the ability to set up a light microscope for optimum resolution, to prepare routine samples and to observe, identify and report sample characteristics.

This unit of competency is applicable to laboratory or technical assistants in all industry sectors. The unit of competency covers limited interpretation and analysis of results. Troubleshooting of equipment and procedures is not required.

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

Nil

Competency Field

Testing

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

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

1	Interpret test requirements	1.1	Review test request to identify samples to be tested, test method and equipment involved
		1.2	Identify hazards associated with the sample, preparation methods and equipment, and implement workplace control measures
2	Set up work area for preparation	2.1	Collect equipment and arrange the workspace so that equipment can be used safely and efficiently

	and examination of samples	2.2	Perform pre-use and safety checks to ensure equipment is fit for purpose and report faulty or unsafe equipment to appropriate personnel
3	Prepare samples for examination	3.1	Log and label samples according to workplace procedures to ensure traceability
		3.2	Check suitability of the original and prepared sample for the examination, and report unsuitable samples to appropriate personnel
		3.3	Prepare and store the sample for examination following workplace methods
4	Set up and use a light microscope	4.1	Set up the light path to optimise resolution
		4.2	Select the appropriate objectives and filter for the sample being examined
		4.3	Ensure that the lenses are clean
		4.4	Adjust settings and alignment of the light path to optimise performance
		4.5	Place sample correctly on the stage
5	Observe, identify and report sample characteristics	5.1	Recognise and identify significant sample characteristics
		5.2	Perform required calculations accurately
		5.3	Prepare and view control samples and check that results are consistent with expected values
		5.4	Identify and report out-of-specification or atypical results promptly to appropriate personnel
		5.5	Record and report data in accordance with workplace procedures
6	Maintain a safe work	6.1	Ensure safety and minimise cross-contamination through the use of personal protective equipment (PPE)

environment

- 6.2 Handle all samples and equipment in accordance with workplace safety protocols
- 6.3 Clean up spills using appropriate techniques to protect personnel, work area and environment
- 6.4 Minimise generation of waste and environmental impacts
- 6.5 Collect and dispose of all wastes safely
- 6.6 Report hazards and incidents to designated personnel using workplace procedures

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 and quality management
- national work health and safety (WHS) standards and codes of practice, and national measurement regulations and guidelines
- specific codes, guidelines and procedures, such as National Association of Testing Authorities (NATA) accreditation requirements, principles of good laboratory practice (GLP), and Australian code of good manufacturing practice for medicinal products (GMP)
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; calibration and maintenance schedules; material safety data sheets (MSDS) and safety procedures; material, production and product specifications; production and laboratory schedules; workplace

recording and reporting procedures; and waste minimisation and safe disposal procedures

- workplace procedures for microscopic examination of samples

Preparation of samples

Preparation of samples includes, but is not limited to, one or more of:

- drying and cooling
- physical separation, centrifugation, filtration and chemical separation
- sub-sampling
- labelling
- aseptic transfer of specimen
- thin film or smear on a slide
- fixing of films to minimise cell damage and the production of artefacts
- staining of fixed material to illustrate required characteristics
- mounting of stained films, sections and whole mounts to ensure long-term preservation
- permanent labels for smears, films and sections for presentation, storage and retrieval
- selection of diluent to preserve or enhance visibility of the cells to be counted
- serial dilution to enable individual cells to be reliably counted
- filling a counting chamber in one continuous flow without bubbles or overflow
- selection, filling and cover slipping of a clean, dry counting chamber to ensure even distribution of cells during filling

Biological samples

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

- smears, impression smears, sections, squashes, films and whole mounts
- a monolayer of cells in smears and films
- fixed smears for demonstration of bacteria by the methylene blue and Gram staining techniques
- blood films stained by a Romanowsky technique to clearly show differentiation of granulocytes
- stained sections of animal tissues using regressive haematoxylin and eosin to differentiate cytoplasmic and nuclear detail
- differentially stained monocotyledon and dicotyledon stem sections to demonstrate the structure of vascular bundles (xylem, phloem and cambium)
- stained whole mounts of helminths
- whole mounts, such as liver flukes, planaria and samples of

- animal faeces to demonstrate ova, cysts and larvae
- pond water organisms
- onion root tip squash
- midstream sample of urine

Physical samples

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

- sand
- asbestos fibres
- coal samples
- construction materials for testing
- geological specimens

Sample characteristics

Sample characteristics are restricted to what can be viewed by bright light microscopy and include, but are not limited to, one or more of:

- shape and size of particles
- presence of contamination
- colour
- consistency and variability
- number of cells (e.g. cells in blood or other particulate samples, such as a yeast suspension or pollen grains)
- type of cells, percentage of atypical cells, presence/absence of cells, size of cells, viable and non-viable cells and trajectory
- presence of stained material, such as starch
- colour/staining and morphology
- motility

Workplace safety procedures

Workplace safety procedures include, but are not limited to, one or more of:

- ergonomic layout, correct illumination and organisation of workbench
- use of biohazard containers and laminar flow cabinet
- correctly labelling reagents and hazardous materials
- use of PPE, such as safety glasses, gloves and coveralls
- handling and storing hazardous materials and equipment in accordance with labels, MSDS and manufacturer instructions
- regularly cleaning and decontaminating equipment and work areas

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
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health, where relevant

Unit Mapping Information

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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 MSL973007 Perform microscopic examination

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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:

- safely performing microscopic examination of at least three (3) different samples and correctly identifying and reporting the characteristics of each
- checking suitability of samples, such as labelling, spillage, spoilage due to incorrect storage and transport conditions, temperature control and suitability for the examination
- safely preparing routine biological and/or physical samples in accordance with workplace procedures or standard methods
- checking the quality of prepared samples, such as:
 - clean and scratch-free microscope slides to reduce artefacts
 - preparation according to specified procedure/method
 - homogeneous suspension of sample
 - films and smears that have been fixed rapidly
 - thin films with a monolayer of cells
 - appropriate whole mounts for intact organisms
 - correct sample identification during and after processing
- performing pre-use checks of equipment, such as calibration, routine cleaning and maintenance, and use by dates of reagents
- setting up a light microscope for optimal resolution
- accurately observing, identifying and reporting sample characteristics
- performing counts on samples and basic measurements using grids
- performing accurate calculations as required by the method, such as:
 - dilutions
 - percentage viability
 - number of cells in original sample after dilution
 - calculation of cells/ml in a number of squares of a counting chamber
- interpreting and recording test results reliably
- logging and tracking samples through all steps from sample receipt to completion of the examination and reporting
- minimising cross-contamination and contamination of the laboratory and environment
- using personal protective equipment (PPE) and safety procedures to maintain personal safety and that of others

- handling/storing samples and equipment and collecting/disposing of waste in accordance with workplace procedures.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- nature of samples, sample preparation methods, methods of examination and associated hazards
- parts and functions of a light microscope and steps taken to optimise the resolution of images
- importance and appropriate use of controls and certified reference materials
- workplace and/or legal traceability requirements
- relevant 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:
 - MSL922001 Record and present data
 - MSL933002 Contribute to the achievement of quality objectives
 - MSL943002 Participate in laboratory or field workplace safety
 - MSL953001 Receive and prepare samples for testing
- Holistic assessment methods include:
 - review of data records prepared by the candidate, such as counts, observations and results
 - feedback from supervisors and peers about adherence to workplace procedures and sample preparation/examination methods
 - observation of the candidate performing microscopic examinations
 - oral/written questions about workplace procedures covering safe preparation and examination of samples.

- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - a standard laboratory equipped with appropriate equipment, including light microscopes and samples
 - workplace procedures, standard methods and materials
 - equipment, such as glass slides, counting chambers (e.g. haemocytometer), optical graticules and stage micrometers, and tissue culture flasks
 - a light microscope, such as:
 - bright field illumination microscope up to 1000 x magnification
 - stereomicroscopes and dissection microscopes
 - compound microscope
 - phase contrast microscope
 - inverted microscope.
- 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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