



Australian Government

Department of Education, Employment and Workplace Relations

PMLOHS301B Work safely with instruments that emit ionising radiation

Release: 1

PMLOHS301B Work safely with instruments that emit ionising radiation

Modification History

Unit Descriptor

This unit of competency covers the ability to safely store, transport and operate instruments that emit ionising radiation following established safe work practices and in accordance with licensing requirements. Examples include use of process control instrumentation, such as fluid level gauges using radioactive sources, on-site non-destructive testing of weldments using X-ray and gamma ray sources and density testing of asphaltic concrete.

This unit of competency has no prerequisites.

This unit of competency is applicable to laboratory or field operators working under supervision or direction of para-professionals, commonly in a construction materials testing or similar environment.

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.

Application of the Unit

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Employability Skills Information

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance Criteria describe the level of performance required to demonstrate achievement of the element.

Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Store instruments safely and securely	1.1 Identify State or Territory requirements for storage facilities and associated document processes 1.2 Store instruments in accordance with State or Territory requirements and documented procedures 1.3 Secure instruments to prevent unauthorised access 1.4 Record instruments' movements and usage in accordance with documented procedures
2 Transport instruments safely and securely	2.1 Select vehicle suitable for the purpose 2.2 Attach regulation signage in accordance with State or Territory requirements to indicate that radioactive sources are being carried 2.3 Ensure that instruments are properly located and fixed in place 2.4 Ensure security of instruments when the vehicle is unattended
3 Use instruments safely and maintain security	3.1 Follow safe working practices to minimise own exposure to radiation 3.2 Use radiation dosimeter to monitor own exposure to radiation 3.3 Follow safe work practices to minimise exposure of others to radiation 3.4 Follow safe work practices to protect the instrument from damage 3.5 Maintain instrument security
4 Monitor radiation levels	4.1 Check operation and calibration status of radiation survey meter 4.2 Perform radiation survey following documented procedure 4.3 Report atypical conditions and/or problems to

appropriate personnel

- 5 Maintain records
 - 5.1 Record observations, data and results in accordance with enterprise procedures
 - 5.2 Maintain confidentiality of enterprise information
- 6 Perform emergency procedures
 - 6.1 Identify potential emergency situations
 - 6.2 Respond to emergencies in accordance with documented procedures
 - 6.3 Report emergency situations to appropriate personnel.

Required Skills and Knowledge

Evidence Guide

The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence.

Critical aspects of competency

Competency must be demonstrated in the ability to perform consistently at the required standard. In particular, assessors should look to see that the candidate:

- keeps other personnel clear of radiation sources
- demonstrates emergency procedures
- performs and documents radiation surveys
- places the instrument into storage
- safely transports the instrument in a motor vehicle
- safely handles and uses the instrument
- observes, interprets and reports atypical situations
- communicates problems to appropriate personnel promptly.

Underpinning knowledge

Competency includes the ability to apply and explain:

- health, safety and emergency procedures relevant to radioactive devices
- factors affecting radiation intensity
- principles of external radiation protection and practical methods of minimising radiation exposure
- methods of measuring and detecting ionising radiation
- nature of radiation, different types of radiation, their characteristics, sources and shielding methods
- physiological effects of ionising radiation
- State or Territory licensing requirements
- national Codes of Practice
- general guidelines for safe handling of radiation sources.

Assessment context and methods

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

The following assessment methods are suggested:

- analysis of work completed by the candidate over a period of time to ensure accuracy, consistency and timeliness
- observation of candidate using the instruments in a range of work contexts
- review of enterprise documentation completed by the candidate
- feedback from peers and supervisors
- use of suitable simulation and/or a range of case studies/scenarios.

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. Questioning techniques should suit the language and literacy levels of the candidate.

Interdependent assessment of unit

This unit of competency may be assessed with:

PMLOHS302A Participate in laboratory/field workplace safety

PMLTEST411A Perform mechanical tests

PMLDATA400A Process and interpret data.

Resource implications

Resources may include:

appropriate tools, instruments, equipment and materials
enterprise procedures, test methods, equipment manuals.

This competency in practice

Construction materials

Soil moisture density gauges are used extensively for measuring the density of soils, cement treated roadbase, roller compacted concrete and asphalt. They provide a non-destructive means of monitoring compaction operations during construction, so that additional rolling can be provided before the material sets or is covered with another layer. National and State Codes of Practice regulate the use of equipment that emits ionising radiation. States and Territories also have licensing and registration requirements for people involved in owning, storing, transporting or using such equipment.

Soil moisture density gauges are used on construction sites, so they are transported to the test site in motor vehicles. They must be protected from damage and stored safely and securely while not in use. The operator must ensure that bystanders are kept clear to minimise radiation exposure. Owners of gauges are required to have documented procedures and ensure that operators are adequately trained. To ensure the safety and integrity of the gauge, radiation surveys are required at regular intervals. A handheld radiation meter is used, and the results recorded.

Key Competencies

The seven key competencies represent generic skills considered for effective work participation. The bracketed numbering against each of the key competencies indicates the performance level required in this unit. These are stand-alone levels and do not correspond to levels in the Australian Qualifications Framework (AQF).

Level (1) represents the competence to undertake tasks effectively

Level (2) represents the competence to manage tasks

Level (3) represents the competence to use concepts for evaluating and reshaping tasks.

Collecting, analysing and organising information	Communicating ideas and information	Planning and organising activities	Working with others and in teams	Using mathematical ideas and techniques	Solving problems	Using technology
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Level 1	Level 1	Level 1	Level 1	Level 1	Level 2	Level 2
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Range Statement

The range of variables relates to the unit of competency as a whole. It allows for different work environments and situations that will affect performance.

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

Operations are performed in accordance with laboratory and/or enterprise procedures, and appropriate legislative requirements. These procedures and requirements include or have been prepared from:

Australian and international standards, such as:

AS2243 Safety in laboratories, Part 4 Ionising radiation and Part 5 Non-ionising radiation

Codes of Practice prepared by

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)

National Health and Medical Research Council (NHMRC)

State and territory legislation dealing with health and environmental protection

standard operating procedures (SOPs)

equipment manuals

equipment start-up, operation and shutdown procedures

calibration and maintenance schedules

quality manuals

enterprise recording and reporting procedures

production and laboratory schedules

material, production and product specifications

licensing requirements.

Instruments and equipment used may include:

soil moisture/density gauges

borehole logging probes

fluid density/level detectors

battery chargers

radiation monitors/dosimeters

motor vehicles

storage areas for nuclear sources

documentation, including user manuals, enterprise safety manuals

radiation warning signs.

Typical skills may include:

performing radiation surveys using radiation monitors

using radiation dosimeters

transporting instruments containing radioactive materials

storing instruments containing radioactive materials

using instruments containing radioactive materials

maintaining instruments containing radioactive materials.

Hazards and problems may include:

jamming of the source rod in the exposed position

incidents during transportation

fire

theft of equipment containing radioactive sources

on-site accidents

keeping other personnel clear of instrument

instrument breakdown.

Safe working practices include the critical elements for radiation safety

time (reduce the exposure time)

distance (maintain greatest distance possible at all times)

shielding (interpose as much radiation shielding between yourself and the radiation source as possible).

Health, safety and environment

All operations to which this unit applies are subject to stringent health, safety and environmental (HSE) requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

All operations assume the potentially hazardous nature of samples and require standard precautions to be applied. Users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health. All operations are performed in accordance with standard operating procedures.

Unit Sector(s)