Australian Government

MSS025009 Perform sampling and testing of air

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSS025009A Perform sampling and testing of air

Application

This unit of competency covers the ability to collect and test gaseous and particulate components in ambient, indoor and occupational air. Personnel will normally work within an existing sampling or monitoring plan. They will continually monitor levels of risk, apply specified safe working procedures and use prescribed safety equipment.

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as environmental services involved with sampling and monitoring of ambient air, indoor air and occupational air parameters; occupational hygiene; and environmental compliance, auditing and inspection.

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

Pre-requisite Unit

Nil

Competency Field

Sampling and testing

Unit Sector

Environmental

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	**Confirm air sampling and testing requirements with supervisor**	1.1	Review available site information, such as site plan, sampling/testing locations and history of sampling/testing.
		1.2	Confirm the scope and purpose of air sampling/testing and data requirements.

		1.3	Confirm sampling methods, locations, numbers and types of samples, and duration/frequency of sampling from workplace or client's sampling plan.
		1.4	Check that all air sampling/testing procedures are in accordance with client or workplace requirements, relevant standards and guidelines.
2	**Prepare for air sampling and testing**	2.1	Identify site and sampling/testing hazards and review workplace safety procedures.
		2.2	Liaise with relevant personnel to arrange site access and obtain all clearances and/or permits, as necessary.
		2.3	Review field sampling procedures and sample preparation methods required for specific laboratory tests.
		2.4	Select sampling equipment and conditions to achieve representative samples and preserve sample integrity during collection, storage and transit.
		2.5	Ensure all reagents, solutions, standards and blanks (as appropriate) are obtained and/or ready for field use.
		2.6	Select field test equipment/instruments and check operation and calibration, as required, in accordance with procedures and manufacturer instructions.
		2.7	Assemble, check, stow all sampling equipment, field test equipment, materials, containers and safety equipment.
		2.8	Arrange suitable transport to, from and around site, as required.
3	**Conduct sampling of air**	3.1	Locate sampling sites and, if required, services at the site.
		3.2	Conduct representative sampling in accordance with sampling plan and defined procedures for field and/or laboratory testing.
		3.3	Ensure all controls, blanks and replicate samples are properly integrated into the sampling process.

		3.4	Record all information and label samples in accordance with traceability requirements.
		3.5	Record environmental conditions and any atypical observations made during sampling that may impact on sample representativeness or integrity.
		3.6	Transport all samples back to base according to workplace procedures and relevant guidelines.
4	**Conduct field and laboratory testing of air**	4.1	Take sufficient measurements of all samples and standards, if appropriate, to obtain reliable data.
		4.2	Obtain sample or subsample for designated field test or locate established locations for in-situ testing.
		4.3	Set up, check/calibrate and operate equipment, instruments, reagents, gases and in accordance with test methods/procedures and manufacturer instructions.
		4.4	Perform tests, procedures and any observations in accordance with specified methods/procedures.
		4.5	Record all field/laboratory observations and results and ensure that they are accurately transferred to workplace information management system.
5	**Process and interpret air data**	5.1	Review test data noting atypical observations.
		5.2	Ensure calculated values are consistent with expectations.
		5.3	Estimate and document uncertainty of measurement in accordance with workplace procedures, if required.
		5.4	Record processed results in accordance with workplace procedures.
		5.5	Interpret trends in data and/or results and report out-of-specification or atypical results promptly to appropriate personnel.
		5.6	Determine if obvious procedure or equipment problems have led to atypical data or results.

		5.7 Compare results with established air quality standards, statutory environmental quality concentration limits or similar, if relevant.
		5.8 Finalise reporting of results in accordance with workplace requirements.
6	**Maintain a safe work environment**	6.1 Rehabilitate sampling site to render it safe and to minimise environmental impact.
		6.2 Clean all equipment, containers, work area and vehicles according to workplace procedures.
		6.3 Check serviceability of all equipment before storage.
		6.4 Use defined safe work practices and personal protective equipment (PPE) to ensure personal safety and that of others.
		6.5 Minimise the generation of wastes and environment impacts.
		6.6 Ensure the safe collection of all hazardous wastes for appropriate disposal.

Foundation Skills

This section describes those required skills (language, literacy and numeracy) 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.

Legislation, regulations, standards, codes, workplace procedures and requirements	• federal legislation, such as the Environment Protection and Biodiversity Conservation Act, and National Environmental Protection Measures • state/territory government legislation and local government by-laws, policies, regulations and plans dealing with land use,

include the latest version of one or more of:

acquisition, planning and protection; environmental protection, pollution and contaminated sites

- legislation, standards and codes of practice for work health and safety (WHS)
- Australian and international standards covering: environmental management (e.g. AS ISO 14000 Basic Set:2007 Environmental Management Basic Set series and AS ISO 14050-1999 Environmental management - Vocabulary); sampling and analysis of indoor and ambient air, air quality and air monitoring (e.g. AS 2365 Methods for the sampling and analysis of indoor air series; AS/NZS 3580 Methods for sampling and analysis of ambient air series; AS 2986 series Workplace air quality; and AS 2922 Ambient air series)
- registration/licensing and/or accreditation requirements
- industry guidelines and manuals, such as National Environment Protection Measure (NEPM) (Ambient Air Quality), air quality standards, and statutory environmental quality concentration limits
- site plans, maps and specifications; methods and procedures for air sampling and testing to meet workplace, client and/or regulatory/certifying body requirements
- workplace documents, such as standard operating procedures (SOPs); work schedules; recording and reporting procedures; equipment manuals and warranties; supplier catalogue and handbooks; field notebooks or log books; emergency and safety procedures; safety data sheets (SDS); waste minimisation, containment, processing and safe disposal procedures

Ambient air parameters include one or more of:

- inorganic gases, such as:
  - CO and CO_2, NO_x and SO_x,
  - acidic gases
  - hydrogen sulfide
  - ozone
  - fluorides
- organic gases, such as:
  - methane and non-methane hydrocarbons
  - poly-aromatic hydrocarbons (PAHs)
  - organic oxidants and other photochemical smog compounds, such as poly-aromatic nitrates (PANs)
- air toxics, such as:
  - benzene, toluene and xylenes
  - formaldehyde
  - Benzo(a)pyrene (PAH marker)

- particulates, such as:
  - deposited matter
  - suspended matter (PM_{10}, $PM_{2.5}$ and PM_1)
  - particulate fluorides
  - lead.

Indoor air parameters include one or more of:

- inorganic gases, such as:
  - CO and CO_2 and NO_x
  - radon
- organic gases, such as:
  - formaldehyde
  - poly-aromatic hydrocarbons (PAHs)
  - organic oxidants and other photochemical smog compounds, e.g. poly-aromatic nitrates (PANs)
- particulates such as:
  - PM10, PM2.5, and PM1
  - microorganisms and spores.

Occupational (workplace) air parameters include one or more:

- chemicals listed in the '*Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment'*. Concentration levels for action are:
  - peak
  - short term exposure limit (STEL)
  - time weighted average (TWA).

Sampling equipment includes one or more of:

- gas sample bags
- gas sample bottles/containers
- gas pipettes
- gas syringes
- air sampling pumps
- sampling manifolds
- passive diffusion samplers
- impingers (with absorption solutions)
- solid adsorbents
- colour detection tubes
- coated and uncoated filters
- sampling trains in continuous gas monitors
- pitot tubes
- high volume samplers

- dichotomous samplers
- gas flow meters.

Testing equipment includes one or more of:

- continuous gas monitors:
  - ultraviolet (UV) absorption (e.g. ozone)
  - chemiluminescence (e.g. NOx)
  - pulsed fluorescence (e.g. (SOx)
  - non-dispersive infrared (e.g. CO)
  - flame ionisation detection (FID) (e.g. methane)
  - photo ionisation detection (PID)
  - integrating nephelometer methodologies (e.g. suspended particulates)
  - oxygen sensors (e.g. zirconia)
- gas chromatographs
- mass spectrometers
- atomic absorption spectrophotometers
- infrared spectrophotometers
- UV-visible spectrophotometers
- tapered element oscillating microbalance (TEOM)
- beta gauges
- particle counters
- portable (handheld) gas monitors.

Field test equipment includes one or more of:

- navigation and communication equipment (e.g. compass, maps, GPS, two-way radio and mobile phone)
- electric generators and power leads
- calibration gases
- data loggers
- first aid equipment.

WHS and environmental management requirements include:

- compliance with relevant federal/state/territory WHS legislation at all times
- assuming that samples are potentially hazardous and applying standard precautions
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and state/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=5b04f318-804f-4dc0-9463-c3fb9a3fe998