



Australian Government

RIIUND601E Establish and maintain ventilation management systems

Release: 1

RIIUND601E Establish and maintain ventilation management systems

Modification History

Release	Comments
Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 5.0.

Application

This unit describes the skills and knowledge required to establish and maintain ventilation management systems in coal and metalliferous mining, including design, development, audit and review processes and procedures.

It applies to those working in management or technical specialist roles. They generally perform complex, non-routine tasks involving strategic and planning activities and are responsible for establishing and maintaining operational systems and plans.

Licensing, legislative and certification requirements that apply to this unit can vary between states, territories and industry sectors. Users must check requirements with relevant body before applying the unit.

Unit Sector

Coal mining

Metalliferous mining

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Identify, analyse and evaluate hazards associated with mine atmosphere	1.1 Access, interpret and apply ventilation management documentation 1.2 Identify and evaluate the sources and hazards of airborne contaminants 1.3 Identify, analyse and evaluate the likely impact of gas drainage 1.4 Identify, analyse and evaluate the hazards of spontaneous combustion, fire and explosion 1.5 Identify, analyse and evaluate the impact of ventilation pressure differentials

ELEMENT	PERFORMANCE CRITERIA
	1.6 Identify, analyse and evaluate the effect of changes in air temperature, pressure and humidity
2. Identify, analyse and evaluate events which impact on ventilation	2.1 Identify and evaluate the impact of disruption to the ventilation system 2.2 Identify and evaluate the causes and effects of recirculation 2.3 Identify, analyse and evaluate the potential for and likely impact of windblast 2.4 Identify, analyse and evaluate the potential for and likely impact of outburst 2.5 Identify, analyse and evaluate the impacts of holing into previous workings 2.6 Identify, analyse and evaluate the impact of water 2.7 Identify, analyse and evaluate the potential for, and likely impact of spontaneous combustion, fires and explosion
3. Identify, analyse and evaluate mine ventilation control options and measures	3.1 Identify, analyse and evaluate the types, applications and limitations of the ventilation control devices 3.2 Identify and evaluate the impact of mine design on the ventilation system 3.3 Identify and evaluate the methods, purposes and limitations of mine monitoring systems and processes
4. Design and develop ventilation management system	4.1 Access, interpret and clarify legislative and site requirements relating to mine ventilation management 4.2 Incorporate principles and requirements of mine ventilation into the design and development of ventilation system 4.3 Identify design criteria and specifications for ventilation networks and incorporate into ventilation system 4.4 Identify, evaluate and incorporate requirements for mine fans into ventilation system 4.5 Evaluate ventilation control device options against requirements and incorporate into ventilation system 4.6 Incorporate ventilation and environmental monitoring systems into ventilation system
5. Establish ventilation management system	5.1 Establish and incorporate mine ventilation objectives, systems descriptions and responsibilities into ventilation management plan 5.2 Establish procedures for installation, operation and maintenance of ventilation monitoring systems according to site requirements 5.3 Prepare and establish procedures for installation, operation and changes to ventilation control devices according to site requirements 5.4 Determine trigger levels for each hazard and incorporate into ventilation management plan according to site requirements 5.5 Establish ventilation system maintenance program and procedures

ELEMENT	PERFORMANCE CRITERIA
	and incorporate into ventilation management plan according to site requirements 5.6 Incorporate audit, review and update procedures for the ventilation systems into ventilation management plan according to site requirements 5.7 Identify training needs and confirm training plan is established according to site requirements 5.8 Establish procedure for planning, controlling, implementing, recording and communicating changes to mine ventilation systems and components and incorporate according to site requirements
6. Plan and prepare to implement ventilation management system	6.1 Identify and interpret legislative and site implementation requirements relating to mine ventilation management 6.2 Identify, clarify and communicate roles and responsibilities according to ventilation management plan 6.3 Identify, forecast, obtain and allocate/schedule required resources according to ventilation management plan 6.4 Provide, review and implement recommendations for changes to ventilation management implementation procedures as required
7. Audit and review ventilation management system	7.1 Audit ventilation standards according to site requirements 7.2 Audit ventilation control devices according to site requirements 7.3 Audit monitoring systems according to site requirements 7.4 Audit ventilation recording systems according to site requirements 7.5 Audit ventilation system maintenance program and procedures according to site requirements 7.6 Audit the ventilation management training program according to ventilation management plan requirements 7.7 Audit and review the planning process of future ventilation requirements according to site requirements 7.8 Identify and correct non-compliance or other discrepancies/deficiencies revealed by audit

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Numeracy	Calculates resourcing requirements, performs mathematical calculations and applies mathematical and scientific laws and

SKILL	DESCRIPTION
	theorem
Oral communication	Conveys information and requirements clearly and listens actively
Reading	Identifies and interprets relevant information from workplace procedures, documentation and legislation
Writing	Prepares specific information that complies with a range of requirements, using sector-specific vocabulary, grammatical structures and conventions

Unit Mapping Information

Supersedes and is equivalent to RIIUND601D Establish and maintain the ventilation management system.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>

Assessment Requirements for RIIUND601E Establish and maintain ventilation management systems

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- establish and maintain ventilation management systems on at least two occasions, including:
 - identifying, collating and evaluating data, events and activities that impact on ventilation systems
 - identifying and evaluation limitations of ventilations control devices and systems
 - designing and developing the ventilation management system incorporating principles and requirements of mine ventilation, including effects of mine gases
 - establishing technical procedures relating to ventilation
 - confirming training program is established to address training needs relating to ventilation management
 - incorporating mine ventilation plan into work activity
 - conducting enquiries/investigations throughout the audit of ventilation management plan
 - providing solutions to non-compliance or other discrepancy
 - preparing reports on ventilations management plan audits.

During the above, the candidate must:

- locate and apply relevant legislation, documentation, policies and procedures and confirm work activity is compliant
- implement requirements, procedures and techniques for establishing and maintaining ventilation management systems, including:
 - accessing and analysing archival and historical ventilation information
 - interpreting and applying mathematical and scientific theorems/laws related to ventilation
 - accessing, evaluating and applying design criteria for ventilation systems and devices
 - interpreting computer spreadsheets and ventilation modelling/simulations

- accessing, evaluating and applying data from monitoring systems and equipment
- work effectively with others to establish and maintain ventilation management systems in a manner that meets required outcomes, including:
 - communicating clearly and concisely with others to receive and clarify work instructions and convey work progress
 - identifying the relevant information and scope of the work necessary to meet required outcomes
 - establishing technical procedures relating to ventilation management.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- key legislation required to establish and maintain mine ventilation management systems
- key procedures and documentation required to establish and maintain mine ventilation management systems, including archival and historical ventilation information
- principles, methods, applications and limitations of mine ventilation, including:
 - exhaust/force
 - antitropical
 - homotropical
 - flank returns
 - ascensional/descensional
 - bleeder
 - Z/U/Y systems
- principles, methods, applications and limitations of panel ventilation, including:
 - homotropical and antitropical auxiliary fans
 - coursed ventilation (narrow side/wide side)
 - machine mounted scrubber systems
 - compressed air venturis
 - bleeders
- impact of mining techniques and mine and panel design on ventilation
- impact of coal characteristics and coal seam gradients on mine ventilation design
- principles and impacts of ventilation systems on gas drainage, spontaneous combustion, outburst and windblast
- types of mine gases, including:
 - characteristics under varying circumstances
 - sources
 - physiological effects
 - methods of detection
- types of airborne contaminants, including:
 - sources

- physical and physiological effects
- control and mitigation methods
- types of mine fires, including:
 - sources of ignition
 - possible effects on the ventilation circuit
 - prevention, control and mitigation methods
- types of mine explosions, including:
 - ignition sources
 - possible effects on the ventilation circuit
 - prevention, control and mitigation methods
- pressure change principles, including:
 - causes
 - impacts on the ventilation system
 - responses, including the causes and effects of natural ventilation and recirculation
- heat and humidity principles, including sources and factors which may impact ventilation and personnel
- mine roadways and shafts design parameters and impacts on mine ventilation
- principles mine fans, including:
 - fan laws
 - types
 - performance characteristics and configurations
 - applications and limitations
- types of ventilation control devices, including:
 - purposes
 - design criteria and specifications
 - distribution and placement criteria
 - applications and limitations
- de-gassing methods of control, including:
 - brattice
 - auxiliary fans
 - compressed air venturis
 - sails
 - hurdles
 - bleeders
- design criteria, specifications and design processes of ventilation networks and individual circuits
- types, characteristics, uses and limitations of fixed ventilation monitoring systems
- types, characteristics, uses and limitations of portable monitoring equipment
- functions, capabilities, limitation and uses of computer modelling and simulation techniques
- computer-based systems for mine environmental analysis

- ventilation management system development requirements and processes
- types, frequency and method for conducting ventilation surveys, including:
 - pressure
 - quantity
 - temperature
 - gas
 - dust
- processes and techniques for determining alarms and trigger points/levels
- ventilation theory, including:
 - psychrometry and heat
 - gas laws including Charles's law and Boyle's law
 - natural ventilation pressures
 - air quality measurement
 - control device leakage
 - duct leakage
 - regulator
 - equivalent office calculation and Kirchoff's laws
- techniques for identifying individual training needs and reviewing ventilation management system training plans
- principles, processes and techniques for emergency response, evacuation and disaster planning
- techniques for leading and coordinating work activities with others.

Assessment Conditions

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
 - ventilation management plan
- be conducted in a safe environment; and,
- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with relevant legislation/regulation and using policies, procedures and processes directly related to the industry sector for which it is being assessed; and,
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated work environment* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

Assessor requirements

Assessors must be able to clearly demonstrate current and relevant industry knowledge and experience to satisfy the mandatory regulatory standards as set out in the Standards for Registered Training Organisations (RTOs) 2015/Australian Quality Training Framework mandatory requirements for assessors current at the time of assessment and any relevant licensing and certification requirements. This includes:

- vocational competencies at least to the level being delivered and assessed
- current industry skills directly relevant to the training and assessment being provided
- current knowledge and skills in vocational training and learning that informs their training and assessment
- formal relevant qualifications in training and assessment
- having knowledge of and/or experience using the latest techniques and processes
- possessing the required level of RII training product knowledge
- having an understanding and knowledge of legislation and regulations relevant to the industry and to employment and workplaces
- demonstrating the performance evidence, and knowledge evidence outlined in this unit of competency, and
- the minimum years of current** work experience after competency has been obtained as specified below in an industry sector relevant to the outcomes of the unit.

It is also acceptable for the appropriately qualified assessor to work with an industry expert to conduct assessment together and for the industry expert to be involved in the assessment judgement. The industry expert must have current industry skills directly relevant to the training and assessment being provided. This means the industry subject matter expert must demonstrate skills and knowledge from the minimum years of current work experience after competency has been obtained as specified below, including time spent in roles related to the unit being assessed:

Industry sector	AQF indicator level***	Required assessor or industry subject matter expert experience
Drilling, Metalliferous Mining, Coal Mining, Extractive (Quarrying) and Civil Infrastructure	1	1 year
	2	2 years
Drilling, Coal Mining, Extractive (Quarrying), Metalliferous Mining and Civil Infrastructure	3-6	3 years
Other sectors	Where this unit is being assessed outside of the resources and infrastructure sectors assessor and/or industry subject matter expert experience should be in-line with industry standards for the sector in which it is being assessed and where no industry standard is specified should comply with any relevant regulation.	

*Guidance on simulated environments has been stipulated in the Companion Volume Implementation Guide located on VETNet.

**Assessors can demonstrate current work experience through employment within industry in a role relevant to the outcomes of the unit; or, for external assessors this can be demonstrated through exposure to industry by conducting a minimum number of site assessments as determined by the relevant industry sector, across various locations.

*** While a unit of competency does not have an AQF level, where a unit is being delivered outside of a qualification the first numeric character in the unit code should be considered as the AQF indicator level for assessment purposes.

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