



Australian Government

Department of Education, Employment and Workplace Relations

RIIDES307 Test, determine the cause and rectify excessive emission levels on diesel engine systems

Release: 1

RIIDES307 Test, determine the cause and rectify excessive emission levels on diesel engine systems

Modification History

Not applicable.

Unit Descriptor

This unit covers the testing, determining the cause of and rectifying excess emission levels of diesel engine systems for underground coal mines. It includes: planning and preparing for and carry out emission testing; determination of the cause of excessive emission levels and carrying out maintenance to rectify the situation; and the completion of post work activity requirements

Application of the Unit

This unit is appropriate for those undertaking the inspection, testing and maintenance of diesel engine systems for underground coal mines

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Metal, mechanical, electrical or automotive trades or mechanical or electrical engineering

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

1. Plan for testing and/or rectification tasks	1.1 Access, interpret and apply <i>compliance and other documentation</i> relevant to the <i>testing, determining the cause</i> of and <i>rectification</i> of excessive <i>emission</i> levels on <i>diesel engine systems</i> 1.2 Obtain, interpret and clarify <i>work requirements</i> for the completion of tasks 1.3 Resolve coordination requirements with <i>others</i> at the site prior to commencing and during work activities
2. Prepare for testing and/or rectification tasks	2.1 <i>Inspect and prepare work area</i> in <i>coordination with others</i> 2.2 Identify and obtain <i>items</i> and <i>tools</i> required for the safe, effective and efficient conduct of the tasks. 2.3 Identify and arrange <i>support</i> required for the safe, effective and efficient completion of the tasks 2.4 Select and use <i>personal protection equipment</i> appropriate to the task 2.5 Carry out required equipment <i>pre-start and inspection procedures</i> 2.6 Carry out isolation and lock-out of all equipment necessary for the safe execution of tasks 2.7 Recognise and respond to <i>hazardous and emergency situations</i>
3. Carry out testing of emission levels and determine the cause of excessive emission levels	3.1 Select and operate testing equipment and methods 3.2 Carry out testing on diesel engine systems 3.3 Test and report on the performance of diesel oxidation catalyst system 3.4 Determine the cause of any excessive emission levels 3.5 Report outcomes of testing to appropriate person
4. Rectify excessive emission levels	4.1 Select and use maintenance items, tools and equipment 4.2 Carry out <i>maintenance</i> to rectify excessive emission levels on diesel engine systems
5. Complete post-work activity requirements	5.1 Tidy up the work area 5.2 Dispose of used oil, lubricant and other waste 5.3 Return and secure all tools and re-usable items 5.4 Complete and maintain inspection, testing and maintenance

	<i>records</i>
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Required Skills and Knowledge

Required skills

Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to test, diagnose the cause of and rectify excessive emission levels on diesel engine systems used:

- apply legislative, organisation and site requirements and procedures
- apply site risk, statutory compliance, health, safety, environmental, quality and communication requirements and procedures
- apply site and manufacturer's requirements and procedures
- apply surface and underground worksite hazard identification and risk management requirements and procedures
- apply task hazard identification and risk management requirements and procedures
- apply technical literacy
- interpret and apply technical and scientific/industry terminology
- communicate with those providing support
- apply work area and equipment inspection procedures
- apply work area safeguarding options and requirements
- apply isolation and lock-out requirements and procedures
- apply hazard and emergency procedures
- apply site service and maintenance reporting requirements and procedures
- work wearing appropriate personal protective equipment
- use tools required for the performance of inspection, testing and maintenance tasks
- use calibrated or verified instruments for testing

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following, as required to test, diagnose the cause of and rectify excessive emission levels on diesel engines:

- site risk, statutory compliance, health, safety, environmental, quality and communication requirements and procedures
- limitations on allowable maintenance including work in hazardous environments
- limitations on allowable modifications and the required controls and procedures
- site and manufacturer's requirements and procedures
- health effects of diesel exhaust emissions including;
- gaseous emissions
- diesel particulate matter:
- allowable limits (base line limits, raw exhaust and general body)
- emission test procedures (AS/NZS3584 & MDG 29)
- raw exhaust test procedure

- general body test procedure
- ventilation requirements for emission dilution
- mine management system to control emissions
- defects and failure modes that may cause non-compliant emissions (including increased backpressure)
- principles employed to limit the creation of and to manage harmful emissions from diesel engines that may include;
- engine settings and adjustments
- engine system maintenance
- electronic controls (ECM) and injection systems
- the emissions effects of increased air induction systems, including: super-charging and turbo-charging
- exhaust gas re-circulation (EGR)
- diesel oxidation catalyst (DOC)
- selective catalytic reducer (SCR)
- particulate (smoke) filter (DPM)
- use of water-based conditioners
- the effect of distillate (diesel fuel) types on emissions
- tools required for the performance of inspection, testing and maintenance tasks
- provisions of AS/NZS3584.1, 2 and 3 relating to fasteners and joints
- recognise the requirements and performance of various types of fasteners, including bolts, studs, threads and washers
- site inspection, testing and maintenance support requirements and availability
- site work area inspection requirements
- site work area safeguarding options and requirements
- site isolation and lock-out requirements and procedures
- site hazard and emergency procedures
- site inspection, testing and maintenance reporting requirements and procedures
- site inspection, testing and maintenance record procedures
- site requirements and procedures for working in isolation
- site requirements for the use of personal protective equipment

Evidence Guide

Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for the testing, determination of the
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	cause of and rectification of excessive emission levels on diesel engine systems • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of the testing, determination of the cause of and rectification of excessive emission levels on diesel engines systems • working with others to undertake and complete the testing, determination of the cause of and rectification of excessive emission levels on diesel engines systems that meets all of the required outcomes • consistent timely completion of the testing, determination of the cause of and rectification of excessive emission levels on diesel engine systems that safely, effectively and efficiently meets the required outcomes
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Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods: • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes • consistently achieving the required outcomes • first hand testimonial evidence of the candidate: • working with others to undertake and complete the testing, determination of the cause of and rectification of excessive emission levels on diesel

	engine systems
Guidance information for assessment	• Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

Compliance and other documentation to include:	• certification documentation • registration documentation • legislative, organisation and site requirements and procedures • manufacturer's specifications and guidelines • Australian Standards and Guidelines, including: AS/NZS3584 and MDG 29 • codes of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Testing may include:	• testing the composition of exhaust emissions within the exhaust stream under load conditions • testing the diesel engine system for; • NO_x (oxides of nitrogen), • CO (carbon monoxide), • CO₂ (carbon dioxide) • diesel particulate matter
Determining the cause may include:	• root cause analysis • troubleshooting techniques
Rectification is:	• the combination of actions carried out to restore a diesel engine system to, a condition in which it is able to meet the requirements of the relevant specification and perform its required function
Emissions may include:	• NO_x (oxides of nitrogen) • CO (carbon monoxide) • CO₂ (carbon dioxide) • diesel particulate matter Excessive emissions may be contributed to by: • inlet or exhaust restriction • engine wear • component failure • contaminated or non-compliant fuel • incorrect fuel/air ratio • lubrication oil in the combustion chamber • the product of abnormal combustion (unintended fuels being breathed by an engine)
Diesel engine systems are:	diesel engines for underground coal mines and their: • inlet systems

	• exhaust systems • cooling systems • starting systems • shut-down and protection systems • electrical or electronic devices
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Work requirements may come from briefings, handovers, and work orders and may include:	• service and maintenance schedules • production requirements • nature and scope of tasks • achievement targets • operational conditions • operational requirements • site layout and out of bounds areas • worksite inspection requirements • plant or equipment defects • hazards and potential hazards • coordination requirements or issues
Others may include:	• yard persons • processing plant operators • mobile plant operators • other maintenance personnel
Inspect and prepare work area may include:	• determining if the proposed work area is a designated safe area • identification of hazards, including: • workshop work area hazard • underground work area hazards • work activity hazards • selection and implementation of control measures for the hazards identified • safeguarding site and non-site personnel by: • erection of barricades and posting of signs • selection of appropriate equipment to ensure personnel safety and protection
Items may include:	• replacement parts • fasteners • packing materials
Tools may include:	• hand tools • power tools • special tools • testing equipment
Support may include:	• other site personnel • contractors • cranes • other lifting equipment
Personal protection equipment may include:	• hard hats • eye protection • hearing protection

	• breathing apparatus • gas/fume masks • prescribed footwear
Pre-start and inspection procedures include:	• checking: • cleanliness, particularly coal dust • diesel and other flammable liquid leaks • coolant leaks in radiator or radiator hoses • coolant level • guards are in place and secure • engine oil level is correct
Hazardous and emergency situations may include:	• working alone • personal injury • fire • explosions • emissions • electrical • noise • dust • noxious gases • environmental • chemical
Maintenance is to include:	• service • adjust • replace
Maintenance may include:	• repair • overhaul • modify
Records may include:	• inspection and test results • defect identified • defect rectification carried out • item consumed • hazard/risk management reports

Unit Sector(s)

Coal Mining (Diesel Engine Systems Maintenance)

Custom Content Section

Not applicable.