



Australian Government

Department of Education, Employment and Workplace Relations

MEM18024B Maintain engine cooling systems

Release: 1

MEM18024B Maintain engine cooling systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assessing cooling system operation, and repairing or replacing faulty components.
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Application of the Unit

Application of the unit	Cooling system testing would typically require the person to obtain air and/or water flows, temperatures and pressures; assess serviceability; and repair a range of flow/pressure regulators, sensors, actuators and solenoids on shutter type systems or fan drives, or on water type inter/after coolers and oil coolers. Typical symptoms of faults would be coolant pressures and the presence of steam, gases, oil, fuel or air. This unit would typically apply to engine or vehicle cooling systems. On large stationary plant, cooling systems may include the use of cooling towers. All is work undertaken to manufacturers specifications and standard operating procedures. Band: A Unit Weight: 2
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.
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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

ELEMENT	PERFORMANCE CRITERIA
1. Assess cooling system operation	1.1. Heat transfer characteristics, water treatment, and corrosion principles and terminology are understood. 1.2. Relevant information is obtained and correctly interpreted prior to any testing. 1.3. System checks are undertaken safely and to prescribed procedures. 1.4. Water/air flows, pressures and temperatures are correctly determined and recorded. 1.5. Faults are correctly isolated to component level and appropriate corrective action is determined. 1.6. Test equipment is adapted and used correctly. 1.7. Coolant test samples are correctly obtained and tested. 1.8. Component parts are correctly assessed for reuse or replacement.
2. Rectify faulty components	2.1. Component wear and clearances are correctly determined using appropriate test equipment and manufacturers' recommendations. 2.2. Replacement components are correctly selected for application using manufacturers' data. 2.3. Components are removed and refitted to engine by following prescribed procedures. 2.4. Test and repair/replacement activities are accurately recorded. 2.5. Engine is free of coolant leaks and the cooling system contains the correct level of additive/inhibitor after repair work is carried out.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions,

REQUIRED SKILLS AND KNOWLEDGE

- specifications, standard operating procedures, charts, lists, drawings and other applicable documents
- planning and sequencing operations
 - checking and clarifying task-related information
 - checking the cooling system safely and in accordance with standard operating procedures
 - accurately measuring and recording water/air flows, pressures and temperatures of the cooling system
 - identifying faulty component(s)
 - adapting test equipment for use on the cooling system being tested
 - obtaining and interpreting coolant test samples
 - checking cooling system components for wear and clearances using appropriate equipment
 - testing coolant condition including anti-corrosion, anti-freezes etc.
 - interpreting relevant specifications, parts lists, catalogues etc.
 - obtaining replacement parts
 - removing and refitting cooling system components
 - undertaking test and repair/replacement activities on the cooling system
 - testing the engine for coolant leaks after repair
 - checking for conformance to specifications
 - undertaking calculations and numerical operations within the scope of this unit
 - reporting and documenting task related information

Required knowledge

Look for evidence that confirms knowledge of:

- the principles of heat transfer as applied to cooling systems
- the effect of water treatment and corrosion on the effectiveness of cooling system operation
- the components of the cooling system and their function
- the checks and procedures to be carried out on cooling systems
- hazards and control measures associated with testing cooling systems, including housekeeping
- the procedures for measuring water/air flows, pressures and temperatures in cooling systems
- the necessary tools, techniques and equipment to carry out the above tests
- variations of test results from specifications and the likely causes of those variations
- the appropriate corrective action to be taken when variations are identified
- the precautions to be taken when adapting test equipment
- the procedures, tools, techniques and equipment for testing coolant test samples
- the reasons for identifying faulty components for repair or replacement

REQUIRED SKILLS AND KNOWLEDGE

- the procedures for testing components for wear and clearances and the appropriate measuring/test equipment
- the procedures for obtaining replacement parts
- the procedures for removing/replacing cooling system components from the engine
- the procedures for checking coolant levels and engine coolant leaks
- the correct amount of additive/inhibitor to be added to the coolant
- the procedures for recording test and rectification
- safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

A person who demonstrates competency in this unit must be able to maintain and rectify engine cooling systems. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Context of and specific resources for assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining and rectifying engine cooling systems, or other units requiring the exercise of the skills and knowledge covered by this unit.

Method of assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

EVIDENCE GUIDE**Guidance information for assessment****Range Statement****RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Tested

Includes testing for coolant condition i.e. correct, anti-corrosion, antifreezes etc.

Component

Sensors, caps, gauges, pumps, fan drive belts etc.

Unit Sector(s)**Unit sector****Co-requisite units****Co-requisite units**

Competency field

Competency field	Maintenance and diagnostics
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