



Australian Government

AURTTM3008 Dismantle and evaluate engine blocks and sub-assemblies

Release 2

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Modification History

Release	Comment
Release 2	Replaces AURTTM3008 Dismantle and evaluate engine blocks and sub-assemblies (Release 1) Reference to OHS legislation replaced with new WHS legislation

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to dismantle, inspect, evaluate and determine preferred repair action of engine block and sub-assemblies as part of an engine reconditioning process. No licensing, legislative, regulatory or certification requirements apply to this unit at time of endorsement.
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Application of the Unit

Application of the unit	Work applies to a range of engine blocks and sub-assemblies in an engine reconditioning process. Engine blocks to be dismantled and evaluated may include those of light vehicles, heavy vehicles, agricultural and plant equipment, recreational vehicles and motorcycles.
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Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

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. Prepare to dismantle engine block and sub-assemblies	1.1 Workplace instructions are used to determine job requirements, including method, process and equipment 1.2 Information is accessed, procedures and methods are analysed, and appropriate tooling options are selected for dismantling engines and sub-assemblies 1.3 Tools and measuring equipment are checked and prepared for operation 1.4 Safe operating procedures and workplace health and safety (WHS) and environmental requirements are observed throughout the work 1.5 Engine is set up for dismantling using appropriate lifting equipment and avoiding fluid spillage 1.6 Engine block and sub-assemblies are cleaned in line with appropriate environmental constraints, and positions of auxiliary equipment are recorded
2. Dismantle engine block and sub-assemblies	2.1. Correct information is accessed and interpreted from manufacturer or component supplier specifications 2.2. Covers and ancillary components are removed, cleaned and stored without causing damage to components or system according to workshop requirements 2.3. Engine blocks and sub-assemblies are dismantled and laid out in a logical order using approved methods, tools and equipment and without causing damage to components or system 2.4. Component parts are cleaned using appropriate cleaning agents for the type of material and kept in a logical order in preparation for evaluation
3. Determine repair procedures	3.1. Correct information is accessed and interpreted from manufacturer and component supplier specifications 3.2. Engine block and sub-assembly components are inspected, measured and tested against manufacturer and component supplier specifications and tolerances 3.3. Inspection, measurement and testing are completed without causing damage to components or system

ELEMENT	PERFORMANCE CRITERIA
	3.4.Engine block and sub-assembly components are evaluated against measurements, tests and inspections made 3.5.Repair requirements are identified and reported according to workplace policy and procedures 3.6.Workplace documentation is completed and dealt with in line with inspection, measurement and testing outcomes
4. Finalise dismantle and evaluation processes	4.1.Work performed is documented 4.2.Final inspection is made to ensure safety features are in place 4.3.Engine block and sub-assemblies are prepared for storage according to workplace requirements 4.4.Workplace documentation is processed according to workplace procedures

Required Skills and Knowledge

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

Required skills

- technical skills to:
 - dismantle engine blocks without causing damage to components
 - clean parts using appropriate solutions and procedures
 - identify components for re-use or replacement
 - check for abnormal wear and defects
 - check for conformance to specifications
 - measure to specified tolerances and dimensions
 - identify repair procedures
- communication skills to:
 - follow oral instructions
 - work as part of a team
- literacy skills to:
 - understand quality procedures
 - read, interpret and follow job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
 - obtain and record measurements
 - document required repairs and parts
- numeracy skills to use mathematical ideas and techniques to:
 - assess tolerances and clearances
 - apply accurate measurements
 - calculate component dimensions
- problem-solving skills to:
 - prevent time and material wastage
 - plan and sequence operations
- self-management skills to:
 - select and use appropriate equipment, materials, processes and procedures
 - follow workplace documentation, such as codes of practice and operating procedures
- technology skills to use communication devices and computerised equipment to:
 - search and gather supporting material
 - take, locate, download and view digital images

Required knowledge

- WHS regulations and requirements, equipment, material and personal safety requirements, including:
 - personal protective equipment (PPE) for handling engine blocks and

- sub-assemblies and using chemical cleaning agents
- correct operation of specialised equipment, such as pullers
- manual-handling techniques, including:
 - using machinery for lifting engine blocks and engine components
 - using slings, chains and other lifting equipment according to safe work practices
- dismantling methods and procedures, including:
 - reasons for selecting the chosen tools, techniques and equipment
 - hazards and fluid control measures associated with the removal of engines and engine components, including housekeeping
 - pre-evaluation checks to determine suitability of component to be re-used
 - reasons for checking endfloats before disassembly
 - cleaning solutions and cleaning procedures of components
 - use of pullers, presses and specialised tools, and the application of heat to dismantle components, such as gears, pulleys and dowels
 - procedures for recording the facing directions of pistons, connecting rods, main and big-end caps and positions of removable counterweights and counterweight shafts assemblies
 - precautions to be aware of when removing the connecting rod cap in relation to snap-broken rods
 - removing crankshaft and identifying main bearing caps that have lost register
 - removing dry and wet sleeves
 - dismantling pistons from connecting rods
 - removing camshaft bearings and balance/idler shaft bearings
 - removing welsh plugs and oil gallery plugs
 - removing diesel injection pumps
 - dismantling components that have seized, bent or broken, including seized stud and bolt removal
- measuring, testing and evaluating procedures, including:
 - characteristics of surface finishes and wear patterns as applied to cylinder bores, crankshafts, pistons, gears, cam followers, camshafts, bearings and bushes, block facings, parting faces of connecting rod and main bearing caps
 - crack testing components
 - testing hardness of alloy cylinder blocks, pistons, crankshaft journals and camshaft followers
 - straightness of shafts
 - taper, ovality and wear of:
 - crankshaft and camshaft journals
 - main bearing and connecting rod tunnels
 - cylinder bores in conventional engine blocks and the parent bores of engine blocks with dry sleeves

- camshaft lobe lift
- main bearing tunnels for alignment
- connecting rod alignment and little-end bore size
- cylinder block flatness and deck height
- piston ring land clearance, piston skirt wear and gudgeon pin to piston clearance
- cylinder liner register in both the upper and lower parts of the cylinder block
- oil pump for serviceability
- idler gear hub to bearing clearance
- Australian standards relating to engine reconditioning

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	
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 workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge. A person who demonstrates competency in this unit must be able to: • observe safety procedures and requirements • select dismantling and evaluation methods and techniques appropriate to the circumstances • complete preparatory activity in a systematic manner • complete the dismantling and evaluation of a range of engine blocks and sub-assemblies • measure and check work against manufacturer and component supplier specifications • evaluate components according to workplace requirements and specifications • determine required repair procedures • complete the dismantling and evaluation of engine blocks and sub-assembly components within workplace timeframes • complete work without damage to tools and equipment or injury to persons.
Context of, and specific resources for assessment	Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting. Performance is demonstrated consistently over a period of time and in a suitable range of contexts. Assessment is to occur: • using standard workplace practices and procedures • following safety requirements • applying environmental constraints. Assessment is to comply with relevant: • regulatory requirements

Evidence Guide	
	• Australian standards • industry codes of practice. The following resources must be made available for the assessment of this unit: • appropriate worksite • multi-cylinder engine blocks appropriate to the workplace, including those with and without cylinder sleeves • equipment and hand, air and power tools appropriate to dismantling and evaluating engine blocks and sub-assembly components • specifications and work instructions.
Method of assessment	Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of required skills and knowledge. Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure its correct interpretation and application. Assessment must confirm that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Assessment processes and techniques must be culturally sensitive and appropriate to the language and literacy capacity of the candidate and the work being performed.

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, 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.	
Workplace instructions may include:	• computer-generated instructions • verbal instructions • written instructions.
Information may include:	• Australian standards • engineer's design specifications and instructions • instructions issued by authorised workplace or external persons • workplace specifications and requirements • regulatory and legislative requirements relating to the automotive industry, including Australian Design Rules • safe work procedures relating to the operation of machinery associated with dismantling engine components • verbal, written and graphical instructions, signage, work schedules, plans, specifications, work bulletins, memos, material safety data sheets (MSDS), diagrams or sketches.
Tools and measuring equipment may include:	• depth micrometers • dial bore gauges • dial indicators • inside and outside micrometers • pullers • other specialised tools.
WHS requirements may include:	• individual state or territory regulatory requirements • operational risk assessment and treatments associated with: • electrical safety • machinery movement and operation • manual and mechanical lifting and shifting • toxic substances • working in proximity to others and site visitors • PPE required by legislation, regulations, codes of

Range Statement	
	practice and workplace policies and procedures.
Environmental requirements are to include:	• clean-up management • dust and noise minimisation • waste management.
Sub-assemblies include:	• balance shafts • bearings • belts and pulleys • camshafts • chains • connecting rods • crankshafts • cylinder barrels • cylinder head assemblies • cylinder liners (wet and dry) • gears • idler shafts • oil pumps • pistons • rings.
Positions of auxiliary equipment may include:	• clamps • missing parts • mounting brackets • position of sensors.

Unit Sector(s)

Competency field	Mechanical Miscellaneous
Sector	Technical - Manufacture

Custom Content Section

Not applicable.