



Australian Government

AURTTM012 Carry out camshaft grinding

Release: 1

AURTTM012 Carry out camshaft grinding

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to grind engine camshafts to specific under sizes. It involves preparing for the task, determining camshaft damage and required repair action, preparing and using grinding machines to grind camshafts to specifications and workplace requirements, and completing workplace processes and documentation.

It applies to those working in the automotive service and repair industry. The camshafts include those of engines in vehicles from all sectors of the industry.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Competency Field

Mechanical Miscellaneous

Unit Sector

Technical - Manufacture

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Prepare to grind camshaft	1.1 Job requirements are determined from workplace instructions 1.2 Camshaft is <i>cleaned and inspected</i> , lobe lift is measured, and condition is reported 1.3 Camshaft grinding information is sourced, procedures and methods are analysed, and appropriate grinding machine and

Elements Elements describe the essential outcomes.	Performance Criteria Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
	master are selected for camshaft 1.4 Hazards associated with the work are identified and risks are managed 1.5 Tools and measuring equipment are selected and checked for serviceability 1.6 Camshaft grinding wheel is <i>dressed</i> to match job requirements 1.7 Camshaft is positioned in grinder and clamped according to manufacturer specifications and workplace procedures, and centre run-out and bend are checked
2. Grind camshaft lobes	2.1 Camshaft grinder movement is set to master according to manufacturer procedures, and position of camshaft to master is <i>verified statically</i> 2.2 First set of camshaft lobes are ground according to manufacturer specifications, workplace procedures, and <i>safety and environmental requirements</i> 2.3 Master is re-phased to suit next cylinder's lobes, and lobes are ground according to manufacturer specifications, workplace procedures, and safety and environmental requirements 2.4 Remaining camshaft lobes are ground according to manufacturer specifications, workplace procedures, and safety and environmental requirements 2.5 Camshaft is measured to ensure compliance with specifications and that base circles are true
3. Finish camshaft grinding	3.1 Camshaft is prepared for phosphating according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.2 Camshaft is phosphated according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.3 Journals are finished according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.4 Camshaft profile is identified on camshaft according to workplace procedures 3.5 Bright surfaces are treated with rust prevention solution and camshaft is prepared for further process or storage according to workplace procedures
4. Complete work processes	4.1 Final inspection is made to ensure finished work complies with workplace requirements and camshaft is presented ready for use

Elements	Performance Criteria
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	or storage 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 4.3 Tools and equipment are checked and stored according to workplace procedures 4.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

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

Skills	Description
Learning skills to:	locate camshaft machine settings in workshop and manufacturer literature.
Reading skills to:	- identify and interpret camshaft specifications from workshop literature - interpret machinery safe operating procedures from operating manuals.
Writing skills to:	- legibly and accurately fill out workplace documentation when recording: - parts and materials used - measurements and camshaft specifications.
Numeracy skills to:	- interpret numerical information in manufacturer specifications, workshop literature, and machinery dials, gauges and computer readouts - use basic mathematical operations, including addition and subtraction, to: - convert metric dimensions to imperial, and imperial dimensions to metric - calculate tolerances and clearances.
Planning and Organising skills to:	select best tooling option for the work and sequence procedure to reduce time and material wastage.
Technology skills to:	use precision metric and imperial measuring equipment.

Range of Conditions

This section specifies 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. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Cleaning and inspecting</i> must include:	• determining camshaft lobe profile and timing requirements • checking camshaft centre run-out • checking camshaft for: • bend • drive pin position and condition • fuel pump lobe • gear condition.
<i>Dressing</i> must include:	• dressing grinding wheel by truing • preparing for: • roughing • finishing.
<i>Verifying statically</i> must include:	• checking for lobe taper • checking wheel to lobe contact.
<i>Safety and environmental requirements</i> must include:	• work health and safety (WHS) and occupational health and safety (OHS) requirements, including: • procedures for selecting and using personal protective equipment (PPE) for: • handling camshafts • using chemical cleaning agents • operational risk assessment and treatments associated with: • electrical safety of grinding machinery • grinding machinery movement and operation • procedures for trapping, storing and disposing of cleaning and lubricating fluids released during the grinding process.

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURTTM012 Carry out camshaft grinding

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standard defined in this unit's elements, performance criteria, range of conditions and foundation skills:

- grind one camshaft of an in-line engine with at least four cylinders.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements, including:
 - procedures for selecting and using personal protective equipment (PPE) for:
 - handling camshafts
 - using chemical cleaning agents
 - operational risk assessment and treatments associated with:
 - electrical safety of grinding machinery
 - grinding machinery movement and operation
- environmental requirements, including procedures for trapping, storing and disposing of cleaning and lubricating fluids released during the grinding process
- types, characteristics and limitations of camshaft grinding machines, including use of cam doctors
- cleaning and inspection procedures, including:
 - determining camshaft lobe profile and timing requirements
 - checking camshaft centre run-out
 - checking camshaft for bend
- procedures for preparing camshaft grinding wheel, including:

- dressing and truing to restore original cutting geometry and correct flatness and roundness
- procedures for camshaft lobe grinding, including:
 - roughing and finishing
- procedures for finalising camshaft grinding, including:
 - finishing
 - phosphating
 - identifying camshaft profile on camshafts
- requirements of Australian standards relevant to engine reconditioning, including:
 - AS 4182 Automotive repairs – Code of practice for reconditioning reciprocating spark ignition engines
 - AS 4427 Automotive repairs – Code of practice for reconditioning reciprocating compression ignition engines
- post-grinding procedures, including protection of machined surfaces.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the camshaft grinding that they have carried out, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive repair workplace or simulated workplace
- workplace instructions
- manufacturer camshaft specifications
- AS 4182 Automotive repairs – Code of practice for reconditioning reciprocating spark ignition engines
- AS 4427 Automotive repairs – Code of practice for reconditioning reciprocating compression ignition engines
- camshaft from engine as specified in the performance evidence
- engine camshaft grinding machine
- precision measuring equipment, including:
 - dial indicators
 - inside and outside metric and imperial micrometers.

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