



Australian Government

AURTTM001 Operate and monitor computer numerical control machines

Release: 1

AURTTM001 Operate and monitor computer numerical control machines

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to operate and monitor computer numerical control (CNC) machines during machining operations of engine components as part of an engine reconditioning process. It involves preparing for the task, operating a CNC machine, selecting the appropriate program, performing machining to specifications and workplace requirements, and completing workplace processes and documentation.

It applies to those working in the automotive service and repair industry. The engine components include those 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 operate and monitor a CNC machine	1.1 Job requirements are determined from workplace instructions 1.2 Information is sourced, procedures and methods are analysed, and appropriate options are selected for operating and monitoring

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.
	CNC machine 1.3 Pre-start checks are undertaken according to manufacturer procedures 1.4 Hazards associated with the work are identified and risks are managed
2. Operate a CNC machine	2.1 Computer program is <i>selected and verified</i> according to workplace instructions 2.2 CNC machine is operated to product specifications according to workplace procedures and <i>safety and environmental requirements</i> , and following machinery safe operating procedures 2.3 Machine malfunctions are identified and reported according to workplace procedures 2.4 Machined component is checked to ensure compliance with specifications
3. Perform necessary adjustments during machining process	3.1 Tool wear is monitored and, where appropriate, pre-set tools are replaced, tool offsets are identified in computer-controlled program and adjusted, or other corrective action is taken according to manufacturer specifications and workplace procedures 3.2 Engine component deviation from specification is reported according to workplace procedures
4. Complete work processes	4.1 Final inspection is made to ensure finished work complies with workplace requirements and CNC machine is presented ready for use 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 4.3 CNC machine and equipment are cleaned for use or storage 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 appropriate sources of information efficiently.
Reading skills to:	- interpret engine component specifications from workshop literature - interpret CNC machinery safe operating procedures from operating manuals and signs.
Writing skills to:	legibly and accurately fill out workplace documentation to record measurements.
Oral communication skills to:	- clarify instructions - gain information when setting up machine operation.
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 - interpret metric and imperial increments on precision measuring equipment.
Digital literacy skills to:	navigate computer software, selecting and confirming options.
Problem solving skills to:	determine the most appropriate method of component adjustment or machining for the situation.
Technology skills to:	use metric and imperial precision 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>Selecting and verifying</i> must include:	correct speed and feed rates of tools for cast iron and aluminium.
<i>Safety and environmental requirements</i> must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, including operational risk assessment and treatments associated with: - selecting and using personal protective equipment (PPE)

	when working with CNC machines and using chemical cleaning and lubricating agents • safe operating procedures for operating CNC machinery • environmental requirements, including procedures for trapping, storing and disposing of cooling and lubricating fluids released during machining process.
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Unit Mapping Information

Equivalent to AURTTM3001 Operate and monitor computer controlled machines

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 AURTTM001 Operate and monitor computer numerical control machines

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Performance Evidence

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

- conduct computer numerical control (CNC) machining of a shape in aluminium alloy, in which the work must involve:
 - drilling and tapping four holes
 - machining a pocket in the shape
 - surface machining one face on the shape
- conduct CNC machining of a shape in cast iron, in which the work must involve:
 - drilling and tapping four holes
 - machining a pocket in the shape
 - surface machining one face on the shape.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to operating and monitoring CNC machines, including operational risk assessment and treatments associated with:
 - selecting and using personal protective equipment (PPE) when working with CNC machines and using chemical cleaning and lubricating agents
 - safe operating procedures for operating CNC machinery
- environmental requirements, including procedures for trapping, storing and disposing of cooling and lubricating fluids released during machining process
- procedures for accessing computer-controlled programs installed in the machine controller, including:

- posting appropriate program to the machine
- selecting tool specified by the program and for the material to be machined
- selecting appropriate speeds and feeds
- computer-controlled machine operating procedures, including:
 - zeroing the machine axes
 - engaging warm-up procedures, and checking lubricant levels, coolant levels, and machine slide ways
 - mounting tools in tool holders
 - setting tool speed and feed rates
 - setting tool height manually
 - setting machine offset parameters to correct tool number and height
 - setting work piece datum
 - recording data in machine offsets
 - selecting dry run mode on CNC controller and single block to test program
- procedures for basic editing of computer program to reflect specific job requirements
- typical machine malfunctions, including:
 - programming
 - non-optimal speeds and feeds
 - inflexible controller
- tool wear and effect of wear on product or part specifications
- procedures to be followed once tool wear has been detected
- pre-set tool replacement procedures
- adjustment procedures for tool offsets
- effects of adjustments on machining specifications.

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 CNC machines that they have operated and monitored, 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 engine component specifications

- CNC machines appropriate for machining automotive engine components
- precision measuring equipment relevant to the component and work process
- cast iron and aluminium alloy shapes suitable for the CNC work specified in the performance evidence.

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