



Australian Government

AURTTM3001 Operate and monitor computer numerical control machines

Release 2

AURTTM3001 Operate and monitor computer numerical control machines

Modification History

Release	Comment
Release 2	Replaces AURTTM3001 Operate and monitor computer numerical control machines (Release 1) Reference to OHS legislation replaced with new WHS legislation

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to operate and monitor CNC (computer numerical control) machines. It involves the ability to determine the machining process required, select the appropriate program, and perform machining to specifications and workplace requirements 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	Engine components to be machined may include those from light vehicles, heavy vehicles, agricultural and plant equipment, recreational vehicles and motorcycles. Work is carried out according to award provisions.
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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 operate a CNC machine	1.1. Workplace instructions are used to determine job requirements, including method, process and equipment 1.2. Information is sourced, procedures and methods are analysed, and appropriate work options are selected for operating and monitoring CNC machines 1.3. Safe operating procedures and workplace health and safety (WHS) and environmental requirements are observed throughout the work 1.4. Pre-start checks are undertaken to standard operating procedures
2. Operate a CNC machine	2.1. Computer program is selected and verified according to job instructions 2.2. CNC machine is operated safely to product specifications using standard operating procedures 2.3. Machine malfunctions are identified and reported 2.4. Machining is checked for compliance with specification using standard operating procedures
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 using standard operating procedures 3.2. Engine component deviation from specification is reported according to standard operating procedures
4. Clean up work area and maintain equipment	4.1. Final inspection is made to ensure finished work complies with workplace requirements 4.2. Engine components and equipment are cleaned for use or storage to workplace expectations 4.3. 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:

- monitor the machine or process for signs of tool wear and take corrective action
- measure to specified tolerances and dimensions

communication skills to:

- follow oral instructions
- report deviations from specifications

literacy skills to:

- read and interpret routine job instructions, specifications, drawings and standard operating procedures
- make pre-start checks
- understand quality procedures

numeracy skills to use mathematical ideas and techniques to:

- calculate time
- assess tolerances
- apply accurate measurements
- calculate material requirements
- establish quality checks

problem-solving skills to:

- identify and avoid planning and scheduling problems
- prevent time and material wastage
- organise work and plan processes

self-management skills to:

- select and use appropriate equipment, materials, processes and procedures
- recognise limitations and seek timely advice
- follow workplace documentation, such as codes of practice and operating procedures

teamwork skills to:

- work with diverse individuals and groups
- apply knowledge of own role to complete activities efficiently to support colleagues' activities and tasks

technology skills to use communication devices and computerised equipment to:

- search and gather supporting material
- follow CNC machine operating procedures

Required knowledge

- WHS regulations and requirements, equipment, material and personal safety

requirements relating to the use of CNC machines

- 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 tool in tool holder
 - setting tool height manually
 - setting machine offset parameters to correct tool number and height
 - setting work piece datum/zero point
 - 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
- tool wear and the 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 of tool offsets
- effect of adjustments on machining specifications

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 • communicate effectively with others involved in or affected by the work • select methods and techniques appropriate to the circumstances • complete preparatory activity in a systematic manner • conduct CNC machining of a range of engine components according to workplace, manufacturer and component supplier requirements • produce engine components that comply with workplace requirements.
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 • Australian standards • industry codes of practice. The following resources must be made available for the assessment of this unit: • appropriate worksite

Evidence Guide	
	• CNC machines appropriate for machining automotive engine components • a range of engine 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 pertaining to automotive industry, including Australian Design Rules • safe work procedures relating to the operation of CNC machines • verbal, written and graphical instructions, signage, work schedules, plans, specifications, work bulletins, memos, material safety data sheets (MSDS), diagrams or sketches.
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 • personal protective equipment (PPE) required by legislation, regulations, codes of practice and workplace policies and procedures.
Environmental requirements include:	• clean-up management • dust and noise minimisation • waste management.
Engine components may include:	• engine blocks • engine cylinder heads

Range Statement

	• engine manifolds.
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Unit Sector(s)

Competency field	Mechanical Miscellaneous
Sector	Technical - Manufacture

Custom Content Section

Not applicable.