



Australian Government

MEM05087 Write basic NC/CNC programs for thermal cutting machines

Release: 1

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Modification History

Release 1. Unit code changed. Changes to elements and performance criteria and performance evidence. Supersedes and is not equivalent to MEM05054 Write basic NC/CNC programs for thermal cutting machines.

Application

This unit of competency has been developed for post trade engineering fabrication training and the recognition of post trade skills in writing basic numerical control (NC) and/or computer numerical control (CNC) programs for thermal cutting machines.

It defines the skills and knowledge required to identify computer controlled thermal cutting machine program elements, write a basic program and operation sheet, and trial and complete the program for thermal cutting machines as defined in the unit in conjunction with its prerequisites.

This unit scope includes writing basic programs to describe simple thermal cutting machine operations, including cutting paths, using appropriate software for machines which incorporates single or multiple nozzles and material loaders where they are part of the thermal cutting machine.

Where basic programming of other computer controlled machines is required unit MEM07018 Write basic NC and CNC programs should also be selected.

Where the selection and use of power tools and/or handheld operations is required, the unit MEM18002 Use power tools/hand held operations should also be selected.

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

Band: **B**

Unit Weight: **6**

Pre-requisite Unit

MEM05007 Perform manual heating and thermal cutting

MEM05009 Perform automated thermal cutting

MEM05071 Perform advanced manual thermal cutting, gouging and shaping

MEM05086 Set and edit computer controlled thermal cutting machines

MEM09002 Interpret technical drawing

MEM11011 Undertake manual handling

MEM12023 Perform engineering measurements

MEM13015 Work safely and effectively in manufacturing and engineering

MEM16006 Organise and communicate information

MEM16008 Interact with computing technology

MEM18001 Use hand tools

Competency Field

Fabrication

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Use appropriate personal protective equipment (PPE) in accordance with SOPs 1.4 Identify job requirements from specifications, drawings, job sheets or work instructions
2. Write basic NC/CNC machine program	2.1 Identify machine safety features 2.2 Check alignment of material to machine cutting head/s and datum points 2.3 Select appropriate program elements for machine controller 2.4 Interpret engineering drawings to define basic machine function and cutting path geometry 2.5 Accurately calculate co-ordinates for cutting path 2.6 Write program in standard code format in accordance with procedures
3. Write NC/CNC operation sheet and trial program	3.1 Produce operation sheets to specification in accordance with SOPs 3.2 Operate machine in manual mode to test and prove program 3.3 Edit program to adjust operation based on testing outcome 3.4 Check components for compliance to specification 3.5 Save final program and complete operation sheets and records in accordance with SOPs

Foundation Skills

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

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different 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.	
Basic machine programming includes:	NC/CNC thermal cutting machines which do not require programming using canned cycles and sub-routines.
NC/CNC thermal cutting machines include one or more of the following:	• fuel/gas machines • plasma machines • laser machines.
Standard code format includes:	Common M and G codes.

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM05087 Write basic NC/CNC programs for thermal cutting machines

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include the ability to:

- follow work instructions, standard operating procedures (SOPs) and safe work practices
- identify and interpret job specifications, engineering drawings, and other applicable work instructions for information relevant to writing basic numerical control (NC) and/or computer numerical control (CNC) programs for thermal cutting machines
- interpret basic NC/CNC thermal cutting machines controller elements which do not require programming using canned cycles and sub-routines
- write a basic program in standard code format by interpreting drawings to define basic machine function and cutting path geometry and calculating co-ordinates for cutting path and producing operation sheets to specifications on at least two occasions
- trial and edit basic programs by operating machine in manual mode to test and prove program and adjusting operation as required on at least two occasions
- check components for compliance against specifications.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- elements of a basic NC/CNC program
- function of elements in controlling the operation of an NC/CNC machine
- types of NC/CNC thermal cutting and welding machines and their applications
- thermal cutting operations controlled by a program
- cutting paths to be followed when cutting a part or product and the reasons for selecting cutting paths and sequence of operations
- zero point of the NC/CNC machine
- standard codes, applications and procedures used in the writing of NC/CNC programs
- procedures and information to be included for completing NC/CNC operation sheets
- procedures for manual operation of the NC/CNC machine and reasons for testing and proving the NC/CNC program

- procedures for editing the NC/CNC program via the machine controller
- effects of editing on the operation of the NC/CNC machine and the part or product to be cut
- measuring equipment and techniques used to check for conformance to specification.
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Assessment Conditions

- Assessors must:
 - have vocational competency in writing basic NC/CNC programs for thermal cutting machines at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Assessment must occur in a functioning workplace. Where assessment in the workplace would be unsafe, impractical or threatens the environment, assessment must occur in a sufficiently rigorous simulated environment that reflects the circumstances that would be experienced in a functioning workplace. Assessment must cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills.
- Knowledge assessment may be either verbal or written but must adequately reflect the knowledge requirements of the unit in a functioning workplace.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
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