



Australian Government

MEM07018 Write basic NC and CNC programs

Release: 2

MEM07018 Write basic NC and CNC programs

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM07018 Write basic NC and CNC programs (Release 1).

Release 1. Supersedes and is equivalent to MEM07018C Write basic NC/CNC programs.

Application

This unit of competency defines the skills and knowledge required to write basic numerically controlled (NC) and computer numerically controlled (CNC) machine programs.

It extends to writing a program to describe simple machine operations, including tool paths, using appropriate software for machines. The program may use common M and G codes but does not include the programming of advanced operations using canned cycles and sub-routines. Technical difficulties are resolved in consultation with appropriate technical advisers.

Where basic programming of computer controlled thermal cutting machines is required unit MEM05054 Write basic NC/CNC programs for thermal cutting machines should also be selected.

Where additional machining skills in excess of unit MEM07005 Perform general machining are required appropriate units should also be selected.

Where programming of advanced operations using canned cycles and sub-routines is required unit MEM07019 Program NC and CNC machining centre should also be selected.

Where the selection and use of power tools/hand held operations is required 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: 4

Pre-requisite Unit

MEM07015	Set computer controlled machines and processes
MEM07016	Set and edit computer controlled machines and processes
MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12023	Perform engineering measurements

MEM12024	Perform computations
MEM13015	Work safely and effectively in manufacturing and engineering
MEM14006	Plan work activities
MEM16006	Organise and communicate information
MEM18001	Use hand tools

Plus, one or more of the following, including their prerequisites:

MEM07005	Perform general machining
MEM07028	Operate computer controlled machines and processes

Competency Field

Machine and process operations

Elements and 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
		1.5	Select appropriate NC and CNC program elements for machine controller
2	Write basic NC and CNC machine program	2.1	Interpret engineering drawings to define basic machines, function and tool path geometry
		2.2	Calculate coordinates for simple tool path or basic machining functions

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 2.3 Write program in standard code format in accordance with SOPs
- 2.4 Produce operation sheets to specification in accordance with SOPs

3 Trial program

- 3.1 Operate machine in manual mode to test and prove program
- 3.2 Edit program, if necessary, to adjust operation, as required
- 3.3 Check components for conformance to specification

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

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, accessibility of the item, and local industry and regional contexts) are included.

Basic machines incorporate one (1) or more of the following:

- single spindles
- single tools turrets
- B axis angular
- tool changers
- component loaders of a pallet type, but excludes multiple spindles

Machine operations include one (1) or more of the following:

- welding
- thermal cutting
- metal cutting
- forming and shaping

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, accessibility of the item, and local industry and regional contexts) are included.

Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM07018 Write basic NC and CNC programs (Release 1).

Release 1. Supersedes and is equivalent to MEM07018C Write basic NC/CNC programs.

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 MEM07018 Write basic NC and CNC programs

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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 on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, charts, lists, drawings and other applicable reference documents in writing basic numerically controlled (NC) and computer numerically controlled (CNC) programs
- calculating coordinates for tooling and producing operation sheets for the program and process
- writing NC and CNC machine programs using standard code format
- producing NC/CNC operation sheets
- operating the machine to test it operates to specification undertaking any required editing of the program
- checking parts or products for conformance to specifications.

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 and CNC program and the function of elements in controlling the operation of NC and CNC machine
- machining operations
- types of NC and CNC machines and their applications
- machining operations controlled by program
- tool paths to be followed when producing a part or product
- sequence of machining operations and the reasons for selecting tool paths and sequence of operations
- purpose of the zero point of the NC and CNC machine
- standard codes and procedures for writing used in NC and CNC programs and their applications

- procedures for completing NC and CNC operation sheets and the information to be included in NC and CNC operation sheets
- procedures for manual operation of the NC and CNC machine
- reasons for testing and proving the NC and CNC program
- procedures for editing the NC and CNC program via the machine controller and the effects of editing on the operation of the NC and CNC machine and the part or product to be produced
- measuring equipment/techniques used to check for conformance to specification.

Assessment Conditions

- Assessors must:
 - have vocational competency in writing basic NC and CNC programs 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.
- 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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