



Australian Government

MEM07019 Program NC and CNC machining centre

Release: 2

MEM07019 Program NC and CNC machining centre

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM07019 Program NC and CNC machining centre (Release 1).

Release 1. Supersedes and is equivalent to MEM07019C Program NC/CNC machining centre.

Application

This unit of competency defines the skills and knowledge required to write and trial programs for numerically controlled (NC) and computer numerically controlled (CNC) machining centres.

The program may use common M and G codes and includes the programming of advanced operations, using canned cycles and sub-routines. Programs are trialled and edited as necessary to adjust operation of centre. Technical difficulties are resolved in consultation with appropriate technical advisers.

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: 2

Pre-requisite Unit

MEM07015	Set computer controlled machines and processes
MEM07016	Set and edit computer controlled machines and processes
MEM07018	Write basic NC and CNC programs
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 machine function and tool path geometry |
| | | 2.2 Calculate coordinates for tool path or machine functions, as required |
| | | 2.3 Select advanced operations using canned cycles and sub-routines and apply |
| | | 2.4 Write program in standard code format in accordance with SOPs |

Elements describe the essential outcomes.

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

2.5 Produce operation sheets to specification in accordance with SOPs which includes appropriate Australian Standards, where required

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 to conform 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 and multiple axis

Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM07019 Program NC and CNC machining centre (Release 1).

Release 1. Supersedes and is equivalent to MEM07019C Program NC/CNC machining centre.

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 MEM07019 Program NC and CNC machining centre

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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 programming numerically controlled (NC) and computer numerically controlled (CNC) machining centres
- calculating coordinates for tooling and producing operation sheets for the program and process
- writing NC/CNC program in standard code format and incorporating, where appropriate, canned cycles and sub-routines
- producing NC/CNC operation sheets in accordance with SOPs
- operating the machine centre to test it operates to specification including undertaking any required editing of the program
- checking components 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 NC and CNC program and the function of elements in controlling the operation of NC and CNC machines
- machining operations to be performed in the manufacture of the given part or product
- appropriate types of NC and CNC machines to perform the required machining operations
- machining operations to be controlled by the program to be written
- tool paths to be followed when producing the part or product and the sequence and reasons for selecting the sequence of machining operations to be programmed
- zero point of the NC and CNC machine
- canned cycles and sub-routines accessible in a particular NC and CNC machine and the application of each canned cycle and sub-routine available

- canned cycles and/or sub-routines to be used in the NC and CNC program and reasons for selecting the chosen canned cycles and/or sub-routines
- standard codes and their application used in the writing of NC and CNC programs
- procedures for writing NC and CNC programs in standard code format
- procedures for completing NC and CNC operation sheets and information to be included
- relevant Australian Standards for programming of NC and CNC machine centres
- 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
- specifications of the part or product and measuring equipment/techniques to be used to check for conformance with specifications.

Assessment Conditions

- Assessors must:
 - have vocational competency in programming NC and CNC machining centre 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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