



Australian Government

MEM07020 Program multiple spindle and multiple axis NC and CNC machining centre

Release: 2

MEM07020 Program multiple spindle and multiple axis NC and CNC machining centre

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM07020 Program multiple spindle and multiple axis NC and CNC machining centre (Release 1).

Release 1. Supersedes and is equivalent to MEM07020C Program multiple spindle and/or multiple axis NC and CNC machining centre.

Application

This unit of competency defines the skills and knowledge required to identify numerically controlled (NC) and computer numerically controlled (CNC) machine program elements, write and trial a machine program for multiple spindle and multiple axis NC and CNC machining centres, and prepare an operation sheet.

The program may use common M and G codes and include 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 additional machining skills in excess of MEM07005 Perform general machining are required appropriate units 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: 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
MEM07019	Program NC and CNC machining centre
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 program elements for machine controller
2 Write 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,

Elements describe the essential outcomes.

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

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

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.

Machines incorporate one (1) or more of the following:

- multiple spindles and/or multiple axis/B axis angular
- multiple tool turrets
- tool changers
- component loaders of a pallet type single spindles

Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM07020 Program multiple spindle and multiple axis NC and CNC machining centre (Release 1).

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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 MEM07020 Program multiple spindle and multiple axis 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 multiple spindle and multiple axis 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 and CNC programs in standard code format and incorporating, where appropriate, canned cycles and sub-routines
- producing NC and CNC operation sheets in accordance with SOPs
- operating the multiple spindle and multiple axis NC and CNC machining centre to test it operates to specification 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 machine
- 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 path(s) to be followed when producing the part or product
- sequence of machining operations to be programmed and reasons for selecting the chosen tool path(s) and sequence of operations

- zero point of the NC and CNC machine
- canned cycles and sub-routines accessible in the 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 the information to be included
- relevant Australian Standards for programming multiple spindle and multiple axis NC and CNC machining centres
- procedures for manual operation of a NC and CNC machine
- reasons for testing and proving a 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 multiple spindle and multiple axis NC and CNC machining centres 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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