



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEM07018C Write basic NC/CNC programs**

**Release: 2**

## **MEM07018C Write basic NC/CNC programs**

### **Modification History**

Single band identifier removed to clarify dual status

## Unit Descriptor

<b>Unit descriptor</b>	This unit covers identifying computer controlled machine program elements, writing a basic program and operation sheet, and trialling the program.
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## Application of the Unit

<b>Application of the unit</b>	<p>This unit extends to writing a program to describe simple machine operations including tool paths using appropriate software for machines which may incorporate single spindles, single tools turrets, B axis angular, tool changers and component loaders of a pallet type, but excludes multiple spindles. The program may use common M and G codes but does not include the programming of advanced operations using canned cycles and sub-routines.</p> <p>Machine operations may include welding, thermal cutting, metal cutting, forming and shaping etc. Programs are trialled and edited as necessary to adjust operation of the machine. Technical difficulties are resolved in consultation with appropriate technical advisers. Work would be undertaken autonomously using predetermined standards of quality.</p> <p>If programming of advanced operations using canned cycles and sub-routines is required, see Unit MEM07019C (Program NC/CNC machining centre). Where additional machining skills in excess of Unit MEM07005C (Perform general machining) are required, then appropriate units should also be selected.</p> <p>For basic programming of computer controlled thermal cutting machines, see Unit MEM05054A (Write basic NC/CNC programs for thermal cutting machines).</p> <p><b>Band:</b></p> <p>This unit has dual status and is to be regarded as both a specialisation band A unit and Specialisation band B unit for progression to C7 (AQF level IV).</p> <p><b>Unit Weight: 4</b></p>
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## Licensing/Regulatory Information

Not Applicable

## Pre-Requisites

Prerequisite units		
<b>Path 1</b>	MEM07015B	Set computer controlled machines/processes
	MEM07016C	Set and edit computer controlled machines/processes
	MEM07024B	Operate and monitor machine/process
	MEM07028B	Operate computer controlled machines/processes
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
<b>Path 2</b>	MEM07005C	Perform general machining
	MEM07015B	Set computer controlled machines/processes
	MEM07016C	Set and edit computer controlled machines/processes
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

## Employability Skills Information

<b>Employability skills</b>	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. Identify basic NC/CNC machine program elements	1.1. Appropriate program elements are selected for machine controller.
2. Write basic NC/CNC machine program	2.1. Engineering drawings are understood and interpreted to define basic machine function and tool path geometry. 2.2. Coordinates are calculated for simple tool path or basic machining functions. 2.3. Program is written in standard code format in accordance with standard operating procedures.
3. Write NC/CNC operation sheet	3.1. Operation sheets are produced to specification in accordance with standard operating procedures.
4. Trial program	4.1. Machine is operated in manual mode to test and prove program as required. 4.2. Program is edited if necessary to adjust operation as required. 4.3. Components are checked for conformance to specification as required.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- calculating coordinates of all relevant points on the part or product to be produced
- writing NC/CNC program in standard code format
- producing NC/CNC operation sheet(s)
- operating NC/CNC machine safely in manual mode
- editing NC/CNC program

**REQUIRED SKILLS AND KNOWLEDGE**

- checking parts or products for conformance to specifications

**Required knowledge**

Look for evidence that confirms knowledge of:

- the elements of a basic NC/CNC program
- the function of elements in controlling the operation of an NC/ CNC machine
- machining operations
- type(s) of NC/CNC machine and their applications
- machining operations controlled by program
- the tool path(s) to be followed when producing a part or product
- the sequence of machining operations
- the reasons for selecting tool path(s) and sequence of operations
- the zero point of the NC/CNC machine
- standard codes used in the writing of NC/CNC programs
- applications of standard codes in NC/CNC programming
- procedures for writing NC/CNC programs in standard code format
- procedures for completing NC/CNC operation sheets
- the information to be included in NC/CNC operation sheets
- procedures for manual operation of the NC/CNC machine
- reasons for testing and proving the NC/CNC program
- procedures for editing the NC/CNC program via the machine controller
- the effects of editing on the operation of the NC/CNC machine and the part or product to be produced
- the measuring equipment/techniques used to check for conformance to specification
- hazards and control measures associated with numerical and computer controlled machines, including housekeeping
- safe work practices and procedures

## 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

A person who demonstrates competency in this unit must be able to perform basic NC/CNC programming. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

#### Context of and specific resources for assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing basic NC/CNC programming or other units requiring the exercise of the skills and knowledge covered by this unit.

#### Method of assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.



**EVIDENCE GUIDE****Guidance information for assessment****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, if used 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.

**Basic**

Machines which incorporate single spindles, single tools turrets, B axis angular, tool changers and component loaders of a pallet type, but not multiple spindles

**Unit Sector(s)****Unit sector****Co-requisite units**

Co-requisite units		

## Competency field

Competency field	Machine and process operations
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