Australian Government

Department of Education, Employment and Workplace Relations

MEM12020B Set and operate coordinate measuring machines

Release: 1

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Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting and operating coordinate measuring machines (CMM). It includes setting up/orienting components, selecting and activating part programs, preparing the machine, editing programs and measuring components.

Application of the Unit

Application of the unit	This unit applies to a range of coordinate measuring machines (CMM). Measurement procedure is determined according to established processes, practices, and specifications. Work is carried out autonomously using predetermined standards of quality and safety. The procedures apply to both one-off and multiple components. Appropriate levels of measurement, computer operations and drawing skills should be selected with this unit. Where a range of hand tools is required, Unit MEM08001B (Use hand tools) should also be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify job requirements	1.1. The measurement to be made is determined from instructions/plans and relevant job specifications. 1.2. Drawing information is interpreted correctly, datums established and the range of tolerances applying to components is understood.
2. Set up/orient components	2.1. Pre-start checks are undertaken to standard operating procedures. 2.2. Correct safety procedures are observed and all equipment is checked for safe operation. 2.3. The most appropriate method of clamping/support is determined to minimise distortion and maximise measuring access. 2.4. Component/fixture/clamping devices are correctly set up and oriented.
3. Select and activate part programs	3.1. Part program is identified according to standard operating procedures as required. 3.2. Part program is verified. 3.3. Selected part program is activated according to standard operating procedures.
4. Prepare CMM	4.1. Probe configuration is determined according to specifications. 4.2. Probe configuration is adjusted on coordinate measuring machine according to standard operating procedures. 4.3. Probe angles are checked for compliance and adjusted as required. 4.4. CMM is re-set/re-calibrated. 4.5. Probes are manually aligned for one-off components.
5. Edit part programs	5.1. Part program is edited to compensate for errors or changes to component specifications.
6. Measure components	6.1. Components are measured and checked for conformance to specification. 6.2. Data/report is produced

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 sheets, instructions, standard operating procedures and drawings
- checking and clarifying task-related information
- entering information onto workplace documents
- checking for conformance to specifications
- measuring components to specified tolerances
- using methods of coordinate measurement
- positioning and securing components effectively
- selecting and running part programs
- loading configuring and adjusting probes
- checking and adjusting probe angles
- re-setting/re-calibrating the CMM
- taking manual hits
- identifying problems/errors in program
- editing program to ensure accurate operation
- checking results against drawings/specifications and interpreting for non-conformance

Required knowledge

Look for evidence that confirms knowledge of:

- principles and methods of coordinate measurement
- principles and interpretation of geometric tolerancing
- task-related information, symbols and terminology
- pre-start checks
- types and functions of various fixtures/clamping devices
- principles and methods of clamping
- efficient set-up/orientation procedure
- procedures to locate and activate part program
- procedures to verify changes/upgrades to part programs
- various probes and their uses and configurations
- setting and adjusting probes
- requirements and procedures for re-setting/re-calibrating the CMM
- procedure and reason for taking manual hits
- procedures for editing part programs
- procedure for interpreting results

REQUIRED SKILLS AND KNOWLEDGE
• the procedure for maintaining records • reporting procedures • hazards and control measures associated with setting up and operating coordinate measuring machines, including housekeeping • use and application of personal protective equipment • safe work practices and procedures • techniques, tools and equipment to measure components

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 set and operate a coordinate measuring machine.
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 setting and operating coordinate measuring machines 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.
Guidance information for	

EVIDENCE GUIDE	
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.	
Measurement	Includes those which can be measured directly and those that require to be constructed mathematically
Probe	May include solid or electronic trigger probes
Coordinate measuring machine	Manual and machines fitted with microprocessors. Machines may also include horizontal, vertical and gantry tie machines

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement