



Australian Government

PMC554020 Design and prepare models, moulds and dies

Release: 1

PMC554020 Design and prepare models, moulds and dies

Modification History

Release 1. Supersedes and is equivalent to PMC554020D Design and prepare models, moulds and dies.

Application

This unit of competency covers the skills and knowledge required to design and prepare models, moulds, dies, frames and cases to make products from materials such as concrete, clay and ceramics. It applies to large production contexts and smaller craft contexts.

This unit of competency applies to experienced technicians, leading hands, supervisors or those in similar roles who are required to determine the specifications for devices to be made, make the devices, make adjustments to remedy faults and non-conformity and solve problems within area of responsibility.

This unit of competency applies to technician applying specialised theoretical and technical knowledge and well developed skills in situations that require autonomy, discretion and judgement. The person may work alone or as a member of a team or group and will work in liaison with other shift team members, team leader and supervisor, as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Operations

Unit Sector

Not applicable

Elements and Performance Criteria

Elements describe the essential outcomes.

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

1	Design and make models	1.1	Establish model design from drawings, originals or in consultation with the customer
		1.2	Select and prepare appropriate materials for model construction

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| | | 1.3 | Make models ensuring the final product is to specification, and shrinkage is allowed for |
| 2 | Set up and produce block moulds | 2.1 | Select appropriate model to meet specification |
| | | 2.2 | Determine required sections and parting lines |
| | | 2.3 | Check mould meets work health and safety (WHS) needs |
| | | 2.4 | Mix materials as required |
| | | 2.5 | Fill mould with mould material as required |
| | | 2.6 | Remove mould from model when required strength has been achieved |
| | | 2.7 | Finish mould to specifications and register correctly |
| 3 | Prepare cases and frames | 3.1 | Consult manufacturing schedule to determine type of mould to be made |
| | | 3.2 | Select appropriate frame or frames |
| | | 3.3 | Mix materials as required |
| | | 3.4 | Fill block mould |
| | | 3.5 | Remove block mould from the case and frame when required strength has been obtained |
| | | 3.6 | Register and date cases according to procedures |
| | | 3.7 | Prepare block mould for use |
| 4 | Prepare and make working moulds | 4.1 | Select the appropriate case/frame |
| | | 4.2 | Mix and pour mould material as required |
| | | 4.3 | Remove mould from model when required strength has been obtained |
| | | 4.4 | Finish and register moulds to procedures |

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| | | 4.5 | Stack and dry moulds to procedures |
| | | 4.6 | Store moulds to procedures |
| 5 | Prepare dies | 5.1 | Consult manufacturing schedule to determine type of die to be made |
| | | 5.2 | Select and prepare required master die |
| | | 5.3 | Mix and pour die material as required |
| | | 5.4 | Remove die from master die when required strength has been obtained |
| | | 5.5 | Mark and finish dies to enterprise specifications |
| | | 5.6 | Cure and store dies to procedures |
| 6 | Respond to problems | 6.1 | Identify possible routine and non-routine problems in the equipment or process |
| | | 6.2 | Determine problems needing action |
| | | 6.3 | Determine possible fault causes |
| | | 6.4 | Rectify problem using appropriate solution within area of responsibility |
| | | 6.5 | Report problems outside area of responsibility to designated person |

Foundation Skills

This section describes those required skills (language, literacy and numeracy) that are essential to performance.

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, needs of

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

Regulatory framework The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used.

Applicable legislation, regulations, standards and codes of practice include:

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, equipment and production processes and hazardous materials
- Australian/international standards relevant to the materials being used and products being made
- any relevant licence and certification requirements.

All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and such requirements the legislative requirements take precedence.

Procedures All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or any combination of:

- manufacturer's technical information
- job cards
- drawings
- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

Hazards Hazards must be identified and controlled. Identifying hazards requires consideration of:

- heat, smoke, dust, vapours or other atmospheric hazards
- weight, shape, volume of materials to be handled

- hazardous products and materials
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- electricity
- gas
- gases and liquids under pressure
- noise
- rotational equipment or vibration
- plant services (steam, condensate, cooling water, etc)
- structural hazards
- equipment failures
- machinery, equipment and product mass
- limited head spaces or overhangs
- working at heights
- working in restricted or confined spaces
- other hazards that might arise.

Problems Routine and non-routine problems must be resolved.

Routine problems are predictable and have known solutions.

Non-routine problems are unexpected problems or variations of previous problems.

Non-routine problems must be resolved by applying operational knowledge to develop new solutions, either individually or in collaboration with relevant experts, to:

- determine problems needing action
- determine possible fault causes
- develop solutions to problems which do not have a known solution
- follow through items initiated until final resolution has occurred
- report problems outside area of responsibility to designated person.

Operational knowledge includes one or more of:

- procedures
- training
- technical information, such as journals and engineering specifications
- remembered experience
- relevant knowledge obtained from appropriate people.

Tools and equipment

Tools and equipment include:

- block moulds and working moulds
- cases and frames
- hand and power tools
- jigs and fixtures
- master dies
- mixing equipment
- models.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMC554020D Design and prepare models, moulds and dies.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=45a7f1d5-61a5-447a-9688-7abbd7e1a5c7>

Assessment Requirements for PMC554020 Design and prepare models, moulds and dies

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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 and demonstrate the ability to:

- read and interpret drawings, production schedules, job sheets, procedures, material labels and safety information
- establish specifications for devices, including:
 - models
 - block moulds
 - working moulds
 - dies
- design and make models to specifications
- produce block moulds, working moulds and dies
- select and prepare and use materials, fittings, tools and equipment
- monitor key variables, including:
 - raw materials/mix
 - shape
 - dimensions
 - shrinkage
 - strength
 - device integrity and conformance to specification of the moulding item
- make adjustments/repairs to ensure device and meets quality and production output specifications
- identify hazards and apply relevant hazard controls
- handle/store devices
- apply safety procedures
- apply housekeeping procedures
- recognise out-of-specification products, process problems and materials faults
- resolve routine and non-routine problems
- identify when the operator is able to rectify problems, when assistance is required and who is the appropriate source for assistance
- take action to resolve problems or report them to appropriate personnel
- distinguish between possible causes of routine problems, including:
 - incorrect materials

- variations in materials
- equipment malfunction
- procedure errors
- incorrect specifications
- communicate effectively with team/work group and supervisors
- complete workplace records
- do basic arithmetical manipulations, including additions, subtractions, divisions, fractions and percentages.

Knowledge Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to fulfil their job role, including knowledge of:

- principles of design as applicable to models
- functions and limitations of devices, including:
 - models
 - block moulds
 - frames and cases
 - working moulds
 - dies and master dies
- types of materials relevant to making the devices and their application, including:
 - plaster
 - timber
 - rubber
 - metal
 - fibreglass
- product specifications/materials properties that may affect device design, materials and construction
- quality requirements at each stage of construction
- factors which may affect device quality and appropriate remedies
- non-routine problems that may arise, the range of possible causes and appropriate actions
- organisation procedures relevant to the work environment/job role
- hierarchy of control
- hazards that may arise in the job/work environment and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence shall be based on a holistic assessment of the evidence.

- The collection of performance evidence:
- should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant
 - will typically include a supervisor/third-party report or other evidence, focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the use of an appropriate industrial item/s of equipment requiring demonstration of operation, start-up and shutdown procedures and responding to problems
 - may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from demonstration of skills and one or more of:
 - walk-throughs
 - pilot plant operation
 - industry-based case studies/scenarios
 - 'what ifs'.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process such as workbooks, written assessments or interviews (provided a record is kept).
- 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.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition the assessor or anyone acting in subject matter expert role in assessment shall demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they shall assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment

- appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
- appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on the job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

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