



Australian Government

PMBTECH508 Develop a new compound

Release: 1

PMBTECH508 Develop a new compound

Modification History

Release 1. Supersedes and is equivalent to PMBTECH508A Develop a new compound

Application

This unit of competency covers the skills and knowledge required to develop a new compound/formulation or make major modification to an existing compound requiring examination of all components of the compound.

Where modification is being made the aims of the modification may be broad (e.g. reduce cost, improve performance, improve manufacturing) or specific (e.g. meet a particular specification).

A compound is a mixture of materials which is undertaken to a set formula and in specified proportions.

This unit of competency applies to experienced technicians or those in similar roles who are required to apply in-depth knowledge of materials, process, equipment and problem solving in order to determine the appropriate base polymer/polymer blend; determine the appropriate additives; determine the appropriate mixing methods and order; and verify that compound and methods are acceptable in the factory.

The technician will take the lead role in this development project which may contribute to a larger/more complex project being undertaken by a more senior technician.

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

Pre-requisite Unit

Nil

Competency Field

Technical

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	Confirm required	1.1	Communicate with stakeholders regarding technical and
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	properties of compound		aesthetic specification
		1.2	Identify project constraints, such as timelines and cost
		1.3	Draft compound specification and project plan
		1.4	Identify required tests to verify compound meets specification
		1.5	Confirm with stakeholders and modify as appropriate
2	Develop base formulation	2.1	Identify appropriate base polymer/polymer blend
		2.2	Select appropriate fillers/reinforcers and estimate required proportions
		2.3	Select appropriate plasticisers and related materials and estimate required proportions
		2.4	Select appropriate other materials and estimate required proportions
		2.5	Draft initial formulation
		2.6	Draft trial mixing procedure and order of addition
		2.7	Identify any health, safety and environment (HSE) issues and modify as appropriate
3	Mix, test and modify formulation	3.1	Identify and control all hazards for laboratory development program
		3.2	Obtain all required materials and tools/equipment
		3.3	Produce the trial compound following the draft procedures
		3.4	Evaluate the compound compliance with the specification
		3.5	Modify formulation and procedure as required
		3.6	Draft factory trial formula and procedure

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| 4 | Monitor factory trials | 4.1 | Identify and control all HSE issues for factory trials |
| | | 4.2 | Ensure all required materials and tools/equipment are available |
| | | 4.3 | Organise trials at an appropriate time |
| | | 4.4 | Ensure trial is monitored and required data collected |
| | | 4.5 | Evaluate factory trial compound and procedure |
| | | 4.6 | Modify formulation and procedure as required |
| 5 | Complete compound development | 5.1 | Ensure final formulation and procedures are recorded in standard procedures |
| | | 5.2 | Ensure all required materials and tools and equipment will be routinely available as required |
| | | 5.3 | Ensure HSE controls are standardised |
| | | 5.4 | Ensure skill needs of operators have been addressed |
| | | 5.5 | Complete all required reports and records |
| | | 5.6 | Advise stakeholders of the outcome of the project |

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

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, materials and processes being used and products being made
- 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:

- test procedures
- technical specifications
- technical drawings
- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulae/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=932aacef-7947-4c80-acc6-593719fe4090>

Assessment Requirements for PMBTECH508 Develop a new compound

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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 test results, technical information, equipment specifications and instruments/control panels
- determine compound specifications
- identify project stakeholders and constraints
- plan the development, testing and trialling of the compound
- develop appropriate mixing procedures and conditions
- draft initial formulation and mixing procedures
- produce laboratory trial of compound, evaluate conformance to specifications and make modifications to formulation and procedure as required
- monitor factory trial of compound, evaluate formulation and procedure and make modifications as required
- develop formulae for a range of compounds, including:
 - meeting different types of specifications
 - using different components and component amounts
- communicate technical information verbally and in writing
- communicate at all levels about technical issues and bring agreement as to requirements from the different parties
- ensure final formulation and procedures are documented and resources are available for implementation
- calculate proportions, product formulae and process conditions.

Knowledge Evidence

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

- compound components that could be used to meet specifications and:
 - the properties each would bring to the compound
 - the relative advantages and disadvantages of each
 - the change in compound properties with changing amounts of each component
- impact of different mixing methods, order of addition and mixing conditions on the compound

- types and application of tests relevant to the compound
- factors which may affect product quality or production output and appropriate remedies
- 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 is best done from a report and/or folio of evidence drawn from:
 - a single project which provides sufficient evidence of the requirements of all the elements and performance criteria
 - multiple smaller projects which together provide sufficient evidence of the requirements of all the elements and performance criteria.
- A third-party report, or similar, may be needed to testify to the work done by the individual, particularly when the project has been done as part of a project team.
- Assessment should use a real project in an operational workplace. Where this is not possible or where personal safety or environmental damage are limiting factors assessment must occur using 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 or through an independent process, such as workbooks, written assessments or interviews.
- 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.
- 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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