



Australian Government

PMBTECH501 Analyse equipment performance

Release: 1

PMBTECH501 Analyse equipment performance

Modification History

Release 1. Supersedes and is equivalent to PMBTECH501B Analyse equipment performance

Application

This unit of competency covers the skills and knowledge required to analyse and verify equipment performance. It applies to equipment that uses screws and dies/tools as typically used in extrusion, injection moulding and blow moulding.

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 set up and operate performance verification trials, determine actual compared to theoretical performance of equipment and equipment components, and make recommendations based on the results.

This unit of competency may be contextualised to analyse the performance of equipment that does not use screws and dies/tools, however, both the theoretical/mathematical and practical analysis of the process at a level equivalent to a screw/die analysis must be included.

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

Pre-requisite Unit

PMBTECH401 Predict polymer properties and characteristics

MSMOPS401 Trial new process or product

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 **Determine**

1.1 Identify item of plant and plant component to be

	theoretical performance	analysed
		1.2 Locate and interpret design specification
		1.3 Identify process materials being processed/to be processed during verification trial
		1.4 Determine process material properties under process conditions
		1.5 Calculate theoretical performance of component with that material under those conditions
2	Conduct trial	2.1 Design verification trial to be compatible with theoretical analysis
		2.2 Determine measurements needed from trial to yield required data
		2.3 Select equipment suitable to give required measurements
		2.4 Arrange for verification trial with relevant process personnel
		2.5 Set up required measurement equipment
		2.6 Supervise trial and ensure trial conditions are appropriate
		2.7 Collect trial data for analysis
3	Verify performance of component	3.1 Compare theoretical with actual performance
		3.2 Determine significance of variation between theoretical and actual performance
		3.3 Investigate any suspicious results and take appropriate action
4	Recommend required action	4.1 Determine appropriate action to bring performance to desired level
		4.2 Initiate the corrective action to procedures

- 4.3 Determine measures to increase equipment productivity
- 4.4 Re-check performance after corrective action is implemented

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, manual handling, hazardous materials and product specifications
- 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)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

Tools and equipment

Tools and equipment include:

- measuring equipment (e.g. micrometers, tapes, verniers and scales)
- hand tools
- data analysis tools (e.g. computer programs for data recording and presentation).

Hazards

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

- hazardous products and materials
- rotational equipment or vibration
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- smoke, dust or other atmospheric hazards
- moving machinery
- high temperatures
- other hazards that might arise.

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 PMBTECH501 Analyse equipment performance

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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
- calculate the theoretical performance of the screw or die from design specifications
- design and supervise verification trial and gather data to determine the actual performance of the screw or die
- calculate actual versus theoretical performance
- determine significant variations and investigate suspicious results
- determine the 'limiting component' in the performance of an item of equipment or a process
- determine possible performance of an item of equipment/process if practical improvements were made to the 'limiting item'
- make recommendations as to the appropriate action to be taken based on the performance verification results
- record trial results and complete workplace records
- calculate and interpret statistics, 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:

- characteristics and manufacturing behaviours of polymers involved in the process
- polymer materials, their additives and the rheological, heat and other effects of processing to the design of equipment and components to predict practical performance results
- types of data and techniques for calculation of theoretical and actual performance
- 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.
- Where the assessee does not currently possess evidence of competency in *PMBTECH40 Predict polymer properties and characteristics* and *MSMOPS401 Trial new process or product*, one or both may be co-assessed with this unit.
- 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.
- 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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