



Australian Government

Department of Education, Employment and Workplace Relations

PMBTECH501B Analyse equipment performance

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the analysis of the performance, and performance verification, of existing equipment. It applies typically to the extrusion, injection and related sectors of the industry.

This competency is typically performed by a senior technician who will take the lead in the data gathering phase and then analyses the data.

Application of the Unit

Application of this unit

This competency applies to technicians who will set up and operate performance verification trials and then analyse the results to determine actual compared to theoretical performance of equipment and equipment components.

It includes:

- calculating the theoretical performance of a screw, die, etc
- gathering data to determine the actual performance of the screw, die etc
- calculation of actual versus theoretical performance
- making recommendations as to the appropriate action to be taken based on the performance verification results
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisites of *PMBTECH401B Predict polymer properties and characteristics* AND *MSAPMOPS401A Trial new process or product*

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Determine theoretical performance.	1.1 Identify item of plant and plant component(s) to be analysed. 1.2 Locate and interpret design specification. 1.3 Identify process materials being processes/to be processed during verification trial. 1.4 Determine process material properties under process conditions. 1.5 Calculate theoretical performance of component(s) 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(s).	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.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance.

Knowledge of organization procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge as a basis for solving processing and material problems, including:

- the 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
- calculate equipment and component performance from the design specification
- determine equipment and design performance from practical trials
- 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'.

Language, literacy and numeracy requirements

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *PMBTECH40A Predict polymer properties and characteristics* AND *PMBORG403B Conduct trials on products or processes*, they may be co-assessed with this unit.

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

It is essential that competence is demonstrated in the ability to apply a understanding of material and process interactions to be able to interpret data and make judgements about the state of the equipment/component

Consistent performance should be demonstrated. For example, look to see that the performance of at least one type of product on a typical machine has been correctly tested and analysed and that there is evidence that other types of analyses can also be achieved.

Assessment method and context

Assessment will occur on industrial equipment in a work-like environment.

Competence in this unit may be assessed:

- on an appropriate processing plant requiring demonstration of operation and emergency stop procedures
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
 - by using a suitable simulation and/or a range of case studies/scenarios
 - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

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. Add any 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.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the analysis of equipment components such as screws and dies/tools or items of equipment or processes.

This competency applies to all work environments and sectors within the plastics, rubber and cabling industry, but does require both a theoretical/mathematical and a practical analysis of the process at a level equivalent to a screw/die analysis.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

These may include:

- extrusion
- injection
- blow moulding.

Tools and equipment

This competency includes use of equipment and tools such as:

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

Hazards

Typical hazards include:

- moving machinery
- hot surfaces and products.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- worn components
- validation of new components to design specification
- component performance analysis in order to upgrade process performance.

Variables

Key variables to be monitored include:

- measurements
- machine characteristics.
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Unit Sector(s)

Not applicable.