



Australian Government

Department of Education, Employment and Workplace Relations

PMBPROD354B Compound materials using an open mill blender

Revision Number: 1

PMBPROD354B Compound materials using an open mill blender

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the operation and adjustment of open mill blenders to compound materials and the solving of non-routine problems.

Application of the Unit

Application of this unit

This competency is typically performed by advanced operators applying knowledge of materials, product purpose and processes to the operation of open mill blenders to produce product conforming to requirements. It also requires using a range of well developed skills requiring some discretion and judgement to recognise and resolve a range of problems.

This competency is typically performed by operators working either independently or as part of a work team.

The operator will:

- identify and plan own work requirements from production requests
- check settings and adjustments of equipment
- check materials for quality and conformity to specifications
- monitor equipment operation
- make appropriate adjustments to correct materials, equipment or process variations
- deal with non-conforming products, waste and scrap
- solve milling equipment, material and process problems, seeking guidance where necessary or appropriate
- complete logs and reports.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *PMBPROD254A Operate an open mill blender*.

Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

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. Plan own work requirements.	1.1 Identify equipment and processes used for production process and upstream and downstream operations from production plan or request. 1.2 Identify and check materials required including additives. 1.3 Implement measures to control identified hazards in line with procedures and duty of care. 1.4 Identify and check emergency stops, guards and controls. 1.5 Identify requirements for materials, quality, production and equipment checks. 1.6 Identify materials, waste management and housekeeping needs.
2. Start up mill.	2.1 Identify process settings required for product. 2.2 Set process to required settings. 2.3 Check materials are correct. 2.4 Take appropriate action for non-conforming materials. 2.5 Set up date, batch and materials markings to specifications, as required. 2.6 Complete pre-start checks. 2.7 Start up mill.
3. Operate and make minor adjustments to the process to procedures.	3.1 Operate process equipment, noting key variables. 3.2 Monitor controls/displays/terminals for production/process data. 3.3 Take samples as required and identify product out of specification. 3.4 Monitor product/process quality. 3.5 Make adjustments to remedy faults and non-conformity required. 3.6 Establish a stable process. 3.6 Adjust process to minimise scrap. 3.8 Shut down mill as required. 3.9 Clean, adjust and lubricate equipment as required.

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.
4. Anticipate and solve problems.	4.1 Recognise problems or potential problems. 4.2 Determine problems needing priority action. 4.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 4.4 Seek information and assistance as required to solve problems. 4.5 Solve problems within area of responsibility. 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

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

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organization procedures, quality requirements at each stage of production and relevant regulatory requirements (eg quality system and standards, current operating standards) and the ability to implement them within appropriate time constraints and work standards.

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

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

- products, materials and material characteristics
- behaviour of materials in relation to key process variables
- quality requirements at each production stage
- function and operating principles of equipment, machine components and ancillary equipment, including mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation
- impact of key process variables such as speed/speed difference, temperature, nip, bank size, and time on product quality and production output
- impact of material properties, such as rubber nerve, filler volume and dryness, resin tack and accelerator scorch on mixing
- phases of the mixing process such as ban forming, nerve breaking, additive incorporation and homogenisation
- the importance of machine set-up and start-up procedure for effective processing of materials
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of re-using non-conforming materials
- polymer properties and their interactions with process conditions
- relationships between polymer properties and process conditions
- changes to polymer properties to better suit process requirements
- product problems related to polymer properties
- product problems related to process conditions
- adjustments to process conditions to meet polymer and product requirements.

Skill to identify the range of possible causes of product faults including:

- low/high plasticity
- scorch
- strength
- hardness.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements

- maintain output and product quality using appropriate instruments, controls, test information and readings
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when assistance is required to solve problems.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

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 *PMBPROD254 Operate an open mill blender*, it 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 knowledge and skills defined in this unit. These may include the ability to:

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- make adjustments to the process as required
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- the process runs consistently and smoothly, with the minimum need for human intervention.
- all safety procedures are always followed.

Assessment method and context

Assessment will occur on an industrial mill and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using an appropriate industrial mill requiring demonstration of start-up, operation and shutdown 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 applies to the operation of open mill equipment in the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

While primarily intended for the mixing of rubber compounds using an open mill it may also apply to the mixing of plastics or other materials and may apply where mixing and blending is incidental to the operation such as slabbing of striping.

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.

Tools and equipment

This competency includes use of equipment and tools such as:

- open mill and its major components
- hand tools used in the process, eg mill knives

- material loading equipment used for loading of raw materials, eg stock loaders and conveyors, overhead crane arms and hooks
- relevant personal protective equipment.

Hazards

Typical hazards include:

- nip hazards
- cut hazards
- dusts/vapours
- slip and fall (such as caused by scrap of spilled materials)
- temperature (such as hot rubber)
- hazardous materials (including curatives and accelerators, plasticisers, fillers)
- manual handling hazards.

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 problems may include:

- power failures
- incorrect machine adjustments
- incorrect quantities of materials
- incorrect blending times
- equipment breakdowns
- worn rolls
- short scorch products
- forming the initial band
- adjusting bank size for efficient mixing.

Typical product problems many include:

- variations in materials
- contamination of materials
- lack of a homogeneous product.

Appropriate action for problems outside of area of responsibility may be reporting to an appropriate person.

Appropriate action for solving problems within area of responsibility includes asking questions and seeking assistance from appropriate persons/sources.

Variables

Key variables to be monitored include:

- temperatures
- speed (including difference in speed between rolls)
- nip pressures
- colour
- cycle time/process timing
- product/stock/material flow and quality
- product weight and output rate
- product integrity and general conformance to specification and quality sample.
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Unit Sector(s)

Not applicable.