



Australian Government

Department of Education, Employment and Workplace Relations

FDFGR3004A Control mill processes and performance

Release 1

FDFGR3004A Control mill processes and performance

Modification History

Not applicable.

Unit Descriptor

This Unit covers the skills required by a shift miller to control flour and byproduct production in a flour mill. The Unit also includes equipment setting as well as setting equipment and process requirements that must be implemented by other employees. The Unit includes the setting of all break, scratch, sizing, reduction and other milling related processes as well as the supervision of wheat conditioning.

Application of the Unit

This Unit applies to a shift miller who is required to set equipment in a flour mill to control the processes and performance across the mill to achieve maximum extraction and recipe compliance. The Unit applies to all industrial flour mills including semolina mills and including mills without purifiers. It covers the setting of the mill for a variety of grists and finished flour. The miller must also take into account the capability of equipment and the need to avoid imbalances, product build ups and chokes.

Licensing/Regulatory Information

There is no occupational licensing relevant to this Unit.

Pre-Requisites

Nil.

Employability Skills Information

This Unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare or interpret mill flow sheet	1.1 Identify all breaking, reduction and dressing stages in mill. 1.2 Destinations for all stock separations are shown. 1.3 Identify all optional and ancillary equipment. 1.4 Identify all bins, silos, chutes, conveyors and exhausts. 1.5 Maintain diagram showing all equipment and stock flow.
2. Prepare for flour and byproduct production	2.1 Establish customer requirements for shift or production period. 2.2 Follow recipe required to meet desired production quality and quantity targets. 2.3 Check availability of required wheat stock. 2.4 Determine if any changes to grist stock will be required and plan for changes to settings.
3. Determine break system settings	3.1 Adjust break rolls for desired percentage release. 3.2 Conduct visual inspection and test sieving where required to monitor release percentage. 3.3 Monitor break roll passages to avoid saturation of later stages. 3.4 Set bran finishers. 3.5 Set plansifters for desired grading including adjusting spaces between plansifters for varying grains and moisture levels. 3.6 Monitor performance of break system to ensure system is free from semolina.
4. Determine settings for purifiers where fitted	4.1 Maintain and monitor sieve covers. 4.2 Monitor feed rate to purifiers. 4.3 Monitor horizontal and vertical movement of sieve covers. 4.4 Set and monitor air pressure for each aspiration section. 4.5 Select destinations for throughs and lifted bran and other particles. 4.6 Ensure purifier stock is free from flour.
5. Determine settings for scratch or sizing system	5.1 Set scratch equipment or sizing rolls. 5.2 Monitor performance of scratch and sizing rolls.
6. Determine settings for reduction passages	6.1 Set each set of reduction rolls for desired flour and capacity of succeeding reduction passages. 6.2 Monitor covers on sifters for effective dressing from each reduction roll. 6.3 Monitor flake disrupters and impact detachers where fitted. 6.4 Set and monitor reduction settings to achieve required starch damage. 6.5 Specify collection conveyors and bins for each flour stream.
7. Determine settings for final production stages	7.1 Specify use of flour divides for blends. 7.2 Monitor redressing equipment.

- 7.3 Monitor weighing, infestation destroying and metal removal equipment.
 - 7.4 Send finished flour to packing or storage.
- 8. Monitor mill equipment
 - 8.1 Check flutes and rolls for wear and defects.
 - 8.2 Monitor temperature of reduction rolls and performance of water cooling if used.
 - 8.3 Check automatic roll adjustment and protection mechanisms are working correctly.
 - 8.4 Adjust mill settings when required for effect of breakdowns and urgent maintenance.
- 9. Monitor mill performance
 - 9.1 Ensure all grain and flour tests are carried out to required schedule and procedures.
 - 9.2 Adjust settings where required for variation in grain, grist and atmospheric conditions.
 - 9.3 Monitor milling and invisible loss per production period.

Required Skills and Knowledge

This section describes the skills and knowledge required for this Unit.

Required skills include:

Ability to:

- interpret mill flow diagrams
- perform contingency planning for equipment breakdown including failure mode effects analysis
- balance dressing surfaces across break and reduction stages
- adjust break rolls to take into account:
 - number of break stages
 - grist composition
 - specification of finished product
- estimate break roll percentages through visual examination, hand stratification and test sieving.

Required knowledge includes:

Knowledge of:

- alternative and historical milling techniques including:
 - stone grinding
 - "low" or one pass through grinding
 - use of small manual or electric milling machines
 - semolina process vs traditional flour milling process
- conventions and techniques in drawing mill flow diagrams
- characteristics of different grists and their milling requirements
- purpose design and steps in the break process including:
 - overall aim of removing bran from endosperm in large pieces while minimising bran powder and flour
 - roller design
 - flute design
 - roller speed
 - number of passages
 - destinations of product from each break roll
- purpose, design and principles of the purification process including:
 - sieve design
 - role of sifting, shaking, gravity and aspiration (upward air)

- screening decks
- exhaust ports and chambers
- collection of throughs
- overtails
- relationship of purification to later reduction stages
- scratch equipment and process to remove small pieces of bran and germ from endosperm after sizing or purification
- relationship of particle size to reduction roller efficiency
- reduction which grinds flour into required fineness while controlling damage to starch granules and minimising abrasion to any bran and germ particles present
- features and performance characteristics of milling equipment as specified in manufacturers reference material
- relationship between total dressing surface ratio to mill capacity
- calculation of break roll percentages
- mill balance requirements and techniques including:
 - ensuring that stock does not return to immediate preceding passage or equipment
 - feed to first break at a constant rate
 - evenness of feed into rolls
 - maintenance of conveyor and air settings to achieve constant feed
- calculation of mill performance including:
 - invisible loss rate
 - theoretical and actual milling loss rate.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment must be carried out in a manner that recognises the cultural and literacy requirements of the assessee and is appropriate to the work performed. Competence in this Unit must be achieved in accordance with food safety standards and regulations.
Critical aspects for assessment and evidence required to demonstrate competency in this Unit	Evidence of ability to: • interpret mill flow diagrams and production requirements • set and monitor break and reduction system equipment • achieve flour recipes through correct use of grists and mill settings • adjust mill settings for breakdowns and other contingencies.
Context of and specific resources for assessment	Assessment must occur in a real or simulated workplace where the assessee has access to: • personal protective clothing and equipment • work procedures, including advice on safe work practices, food safety, quality and environmental requirements • equipment manuals including operating parameters • specifications, control points and processing parameters • break and reduction roll process and related equipment and services • conditioned grain suitable for the break and reduction roll process • sampling schedules and test procedures and equipment as required • documentation and recording requirements and procedures • cleaning procedures, materials and equipment as required.
Method of assessment	This Unit should be assessed together with core Units and other Units of Competency relevant to the function or work role.

Guidance information for assessment	To ensure consistency of performance, competency should be demonstrated on more than one occasion over a period of time in order to cover a variety of circumstances, cases and responsibilities, and where possible, over a number of assessment activities.
-------------------------------------	---

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. Bold italicised wording, if used in the performance criteria, is detailed below. 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) may also be included.

Mill	The term mill is used to refer to the whole mill site including the actual milling equipment, equipment used for associated processes, and transport, warehouse, maintenance, testing and administration facilities.
Mill flow diagram	A mill flow diagram is a representation of the flow of products through the mill process.
Mill balance	Mill balance refers to achieving settings where each passage in the grain breaking and reduction process ensures that other passages and equipment operate on optimum quantity and quality of stock. It also refers to ensuring that the overall surface area (available contact area for product) is appropriate for that stage or passage and the mill as a whole.
Grain acceptance specifications may include:	• weight • protein • moisture • odour • foreign object criteria • pests and pest treatment residues.
Grinding can refer to:	• the break system which is the process of opening up the grain and scraping away the endosperm • the reduction system which is the process of reducing the endosperm until it can be classified as flour.
Extraction rate	The extraction rate is the number of parts by weight of flour obtained from a hundred parts of grain.
Optional equipment	Optional equipment is milling equipment not found in every mill. Examples include: • bran finishers/brushes • germ production machines • bran rolls • bran grinding rolls

	• micro-detachers.
Throughs	Stock which falls through apertures at each sifting or purifying stage.
Overtails	Stock left after throughs are collected and which depending on the stage may be: • endosperm particles with adhering bran • mainly bran • bran and endosperm requiring further treatment.
Wheatfeed	By product of the milling process including bran of varying sizes and varying amounts of attached endosperm.
Scalping	Scalping is the separation of coarse overtails after grinding
Roll adjustment	Adjustment of roll gaps may be done manually or through computerised.

Unit Sector(s)

Grain Processing