



Australian Government

Department of Education, Employment and Workplace Relations

FDFGR4002A Supervise testing processes for wheat and flour

Release 1

FDFGR4002A Supervise testing processes for wheat and flour

Modification History

Not applicable.

Unit Descriptor

This Unit covers the establishment and supervision of specific quality and testing processes for wheat and flour in a flour mill. The Unit covers the setting of tests to be undertaken, the establishment of acceptable limits and maintaining of accuracy in the mill testing regime.

Application of the Unit

This Unit applies to a flour mill supervisor who is responsible for establishing and supervising the quality regime operating in the mill including compliance with regulatory and commercial requirements. This Unit covers the specific skill and knowledge required for an effective testing regime in a flour mill. The Unit applies to all industrial flour mills including semolina mills and mills without purifiers. It includes ensuring testing and monitoring processes are established and followed and implementation of procedures to be followed in the event of a failure to achieve required performance. The emphasis in this Unit is on the grain and flour specific quality and testing processes used in flour milling. The Unit provides specific industry skill and knowledge and complements other more general quality and compliance Units including Units relating to Hazard Analysis And Critical Control Points (HACCP), and lean manufacturing.

Licensing/Regulatory Information

Not applicable.

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. Identify desired flour specification and other relevant factors for mill products and performance	1.1 Identify customer specification. 1.2 Review range and availability of suitable grain. 1.3 Set target range for grain and flour tests to achieve customer specification, consistency and maximum yield. 1.4 Identify mill critical control points. 1.5 Identify regulatory requirements relevant to mill and mill products.
2. Establish sampling procedures and tests for grain	2.1 Determine tests and sampling for received grain. 2.2 Determine tests and sampling for grists. 2.3 Determine tests and sampling for grain conditioning.
3. Establish sampling procedures and tests for flour	3.1 Determine flour tests to be undertaken at each reduction stage. 3.2 Determine number of samples to be taken to ensure representative results are achieved. 3.3 Determine reference tests required for milling. 3.4 Establish procedures for storage and labelling of samples.
4. Establish statistical process control procedures for mill	4.1 Establish procedures for recording of test results and monitoring period. 4.2 Establish normal distribution standard deviation targets for each test. 4.3 Monitor standard deviations for out of control results. 4.4 Review results against reference tests. 4.5 Determine root cause of out of control results.
5. Establish procedures for test equipment maintenance and accuracy	5.1 Establish maintenance schedules for test equipment in conjunction with suppliers and maintenance staff. 5.2 Identify schedule and staff for calibration of test equipment. 5.3 Ensure written procedures for each test identify actions to be followed in the event of actual or suspected equipment malfunction. 5.4 Arrange for testing of control samples at commencement of each shift or run. 5.5 Record test results and establish monitoring procedures to identify operator or equipment test result variations not related to variation in wheat or flour. 5.6 Arrange for operator training or equipment variation as appropriate.

Required Skills and Knowledge

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

Required skills includes:

Ability to:

- supervise wheat and flour related tests including tests for:
 - moisture
 - contamination/purity
 - protein level
 - protein quality
 - ash content
 - colour
 - starch proportion
 - gluten elasticity and extensibility
- apply basic statistical skills sufficient to calculate averages, means and population and sample standard deviations from given data
- determine tests appropriate to HACCP system critical control points
- determine maintenance schedule and procedures for test equipment
- determine calibration procedures and schedule for test equipment.

Required knowledge includes:

Knowledge of:

- effect of reduction and break stages on flour characteristics including:
 - protein level
 - protein quality
 - ash content
 - colour
 - starch proportion
 - dough rheology
- test and test procedures appropriate to grain including:
 - sample appearance and smell
 - sieving for sample purity
 - near infrared test (NIR) and other tests for moisture, protein content, colour and grain hardness
 - difference between "as is" and "dry weight" and moisture corrected moisture results and conversion of other parameters
 - gluten washing test for protein quality
 - Hagberg Falling Number test including conversion of results to Perten Liquefaction

Numbers

- Kern chondrometer test and other specific weight tests
- tests and test procedures related to flour including:
 - NIR tests for flour moisture, protein content, colour, water absorption, ash content
 - Colour testing using Kent-Jones and Martin flour colour grader
 - Pekar test
 - Laboratory sieve tests
 - Brabender Extensograph and Farinograph test for dough stretching
 - viscosity tests
 - starch damage tests (Farrand method etc.)
 - Chittick test for carbon dioxide release
 - baking tests
- reference tests used for calibration including:
 - oven test for moisture
 - Zeleny test for protein quality
 - Single Kernel Characterisation System (SKCS) test
 - Stenvert test for hardness
 - Electrophoresis test for variety
 - Image analysis for particle size and colour
 - muffle furnace test for ash content
 - fibre tests
- expected extraction rate for different stages of the milling process
- Australian grain characteristics relevant to milling including:
 - variety
 - wheat segregations including soft, Australian Premium White (APW), Hard, Prime Hard (PH)
 - other Australian grain segregations
- typical composition of bread, biscuit and cake making flours including moisture, sugar, starch, protein, fibre, and mineral matter
- flour characteristics giving rise to faults in bread, pasta or other flour based products including:
 - incorrect flour strength
 - incorrect *alpha*-amylase activity
 - incorrect amount of damaged starch
 - bran contamination
 - incorrect improver dosage
 - heat damaged wheat
 - tainted flour
- microbiology tests for grain and flour
- tests used in manufacture of byproducts.

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: - determine tests appropriate to grain used in, and products made by a mill - determine sampling rates for tests - integrate testing regime with HACCP system - maintain integrity of mill testing regime through use of control and reference tests and appropriate calibration and maintenance of test equipment.
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	To ensure consistency of performance, competency

assessment	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.
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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.
Stages of the flour milling process are:	• wheat intake • conditioning • feed to first break • flour coming off each mill i.e. from break and reduction rollers • blending and processing • packing and/or dispatch.
Reference tests	Reference tests are tests which can be used for calibration of other test equipment and procedures. Reference tests can also refer to time consuming or non-standard tests used for specific flours or for investigating unusual results in other tests.
Alpha-amylase	Alpha-amylase is one of the enzymes which break down starch in germinating grain.
Improvers	Improvers are substances which improve the baking quality of flour.

Unit Sector(s)

Grain Processing