



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **FDFGR4001A Control power and automation for milling processes**

**Release 1**

## **FDFGR4001A Control power and automation for milling processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

This Unit covers the matching of milling requirements to available services and equipment including electricity, gas and other fuels, steam generation, hydraulics and pneumatics. It also includes use of computerised and other control equipment to achieve desired milling outcomes.

### **Application of the Unit**

This Unit applies to millers who are required to set and control milling equipment in industrial flour mills including semolina mills and mills without purifiers. It also covers development of strategies for effective use of power and automation and directing programmed and other maintenance in order to ensure that milling performance is maintained. The Unit requires work to be undertaken in accordance with all regulatory and OHS requirements.

### **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 range of utilities and services used by mill	1.1 Establish distributed services used in mill. 1.2 Ensure schematics showing location and distribution of services are available and understood by key personnel. 1.3 Categorise services as critical to mill operation or ancillary. 1.4 Develop contingency strategies in the event of failure of a critical service for the mill.
2. Review mill electric power system for start-up and power demand management	2.1 Identify mains supply terminal, input voltage and electricity supplier. 2.2 Identify mill transformers and distribution to sub-mains. 2.3 Identify back-up generation and supply system including automatic and manual operation conditions. 2.4 Identify location of mill equipment and areas supplied by each sub-main and switchboard. 2.5 Identify key features and requirements of installed electrical safety systems including lock off and isolation switches. 2.6 Obtain maximum demand and diversity factor (power factor correction) and identify implications for mill operations. 2.7 Establish motor control and start up procedures according to manufacturer, engineer and supply authority procedures.
3. Review scope of hydrocarbon fuel use by mill	3.1 Identify capacity and fuel use of any on-site boilers. 3.2 Identify emergency generators and their fuel source. 3.3 Identify other fuel powered equipment and processes. 3.4 Identify location of fuel reservoirs/tanks and review against mill strategy for the prevention of dust explosions.
4. Identify type and location of mill controls	4.1 Identify mill operations and equipment controlled automatically. 4.2 Identify mill operations and equipment controlled through central process control stations/ terminals. 4.3 Identify mill operations and equipment controlled manually. 4.4 Establish back up strategies for mill control in the event of failure of control equipment.
5. Control pneumatic conveying system	5.1 Determine processes where negative or positive pressure is required. 5.2 Monitor air speed and volume requirements for conveying tasks. 5.3 Select air speed and volume appropriate for exhausts. 5.4 Balance negative pressure systems. 5.5 Monitor for abnormal increases in blowline pressure. 5.6 Determine cleaning intervals for dust collectors.
6. Control wheat damping and conditioning	6.1 Monitor adequacy of water supply. 6.2 Determine if feedforward or feedback system is used. 6.3 Supervise moisture testing of wheat.

- 6.4 Set damping system controls for desired moisture level taking into account feed rate and lying in time.
- 7. Establish strategies and practices for efficient use of power and automation
  - 7.1 Maximise throughput to mill capacity where possible.
  - 7.2 Ensure manufacturers' maintenance and lubrication schedules are followed.
  - 7.3 Ensure standard operating procedures for controls and workstations are developed and up to date.

## Required Skills and Knowledge

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

### Required skills include:

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#### Ability to:

- integrate equipment maintenance and lubrication strategies with production requirements
- interpret manuals, other technical information, diagrams and drawings
- identify maximum power demand for mill
- identify typical range of power demand for mill taking into account scope of equipment and average production requirements.

### Required knowledge includes:

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#### Knowledge of:

- types of electric motors and their advantages and disadvantages
- motor control and motor protection strategies
- mechanical power transmission types and principles including:
  - direct drives
  - belt drives
  - chain drives
  - gears
- factors influencing the velocity of particles in free air and in positive and negative air streams
- design principles used in exhaust systems for fans, ductwork and dust collectors
- advantages and disadvantages of axial flow, propeller and centrifugal fans
- advantages and disadvantages of forward, backward and radial bladed rotors
- purpose and function of instrumentation including:
  - proximity switches
  - position sensors
  - transducers
  - tachometers
  - flow meters
  - weighers
  - load cells
  - bin level indicators
  - pressure switches
  - PLCs, SCADA (System Control And Data Acquisition systems) and other programmable instrumentation and systems.

## Evidence Guide

<p>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.</p>	
<p>Overview of assessment</p>	<p>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.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this Unit</p>	<p>Evidence of ability to:</p> <ul style="list-style-type: none"> <li>• identify mill equipment and its location and function</li> <li>• determine control equipment and control options for mill</li> <li>• establish risk management and contingency strategies for mill power and automation.</li> </ul>
<p>Context of and specific resources for assessment</p>	<p>Assessment must occur in a real or simulated workplace where the assessee has access to:</p> <ul style="list-style-type: none"> <li>• personal protective clothing and equipment</li> <li>• work procedures, including advice on safe work practices, food safety, quality and environmental requirements</li> <li>• equipment manuals including operating parameters</li> <li>• specifications, control points and processing parameters.</li> <li>• break and reduction roll process and related equipment and services</li> <li>• conditioned grain suitable for the break and reduction roll process</li> <li>• sampling schedules and test procedures and equipment as required</li> <li>• documentation and recording requirements and procedures</li> <li>• cleaning procedures, materials and equipment as required.</li> </ul>
<p>Method of assessment</p>	<p>This Unit should be assessed together with core Units and other Units of Competency relevant to the function or work role.</p>
<p>Guidance information for</p>	<p>To ensure consistency of performance, competency should be demonstrated on more than one occasion</p>

assessment	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

<p>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.</p>	
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.
Fuel	Fuel refers to hydrocarbon energy sources consumed on site including coal, gas (LNG/LPG), diesel, petrol, fuel oil etc.
Equipment may include:	<ul style="list-style-type: none"> <li>• rollers</li> <li>• purifiers</li> <li>• sifters</li> <li>• gravity feeds</li> <li>• pneumatic feeds</li> <li>• pumps</li> <li>• transformers, switchboards, motors and circuit protection.</li> </ul>
Balancing negative pressure air systems	Balancing of negative air pressure systems may be done manually or through setting and monitoring of automatic air control valves.

## Unit Sector(s)

Grain Processing