



**Australian Government**

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

# **FDFSUG305A Operate a boiler advanced**

**Release: 1**

## **FDFSUG305A Operate a boiler advanced**

### **Modification History**

New Unit based on *SUGPOBA3A Operate a boiler - advanced*.

### **Unit Descriptor**

This unit describes the outcomes required for continuous and short term operation of an advanced boiler and for start-up and shut down after a prolonged break. Boiler operators holding a ticket in Advance Boiler Operation from the relevant state regulatory authority will be granted equivalence in this unit *FDFSUG306A Operate a boiler - advanced* for the purpose of issuing a qualification

### **Application of the Unit**

This unit has application in the sugar milling industry.

### **Licensing/Regulatory Information**

General workplace legislative and regulatory requirements apply to this unit; however there are no specific licensing or certification requirements at the time of publication.

### **Pre-Requisites**

There are no pre-requisite units for this competency standard.

### **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

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1 Prepare the boiler for operation	1.1 Health and safety hazards/maintenance requirements are identified and reported to appropriate personnel according to workplace reporting procedures 1.2 The boiler is purged according to workplace procedure 1.3 Services are confirmed and available 1.4 Pre-operational checks are conducted to confirm operational status of boiler and related equipment
2 Start and monitor boiler operation	2.1 The boiler is started and brought on line safely according to workplace procedures and manufacturer's specifications 2.2 Plant is operated within limits of manufacturer's specifications to meet workplace requirements 2.3 Equipment is monitored to confirm operating condition 2.4 Water quality is tested and adjusted as required 2.5 Sluice water is circulated to remove ash from boiler according to specification 2.6 The workplace meets housekeeping standards
3 Analyse and respond to abnormal performance	3.1 Operating data and plant operating conditions are analysed to identify causes of abnormal performance 3.2 Corrective action is taken in accordance with workplace procedures in response to Hazards, out-of-specification test results and/or plant performance 3.3 Emergency procedures are implemented as required according to workplace procedures and manufacturer's recommendations
4 Handover boiler operations	4.1 Workplace records are maintained in accordance with statutory requirements and workplace procedures 4.2 Handover is carried out according to workplace procedure 4.3 Boiler operators are aware of boiler status and related equipment at completion of handover
5 Carry out an operational shutdown	5.1 The boiler is shut down according to workplace procedures and manufacturer's recommendations 5.2 Maintenance requirements are identified and reported according to workplace reporting procedure
6 Shutdown the boiler and prepare for an internal inspection	6.1 The boiler is shut down according to workplace procedures and manufacturer's recommendations 6.2 The boiler is cleaned internally and externally according to workplace procedures and manufacturer's recommendations 6.3 Valves and fittings are removed in preparation for maintenance
7 Store boiler in	7.1 The boiler is stored in the appropriate storage mode according to

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<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
shutdown mode	workplace procedures and manufacturer's recommendations
8 Record information	8.1 Workplace information is recorded according to workplace recording requirements

## Required Skills and Knowledge

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

### Required skills include:

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#### Ability to:

- access workplace information on combustion and operating requirements
- select, fit and use personal protective clothing and/or equipment
- identify and report hazards and potential hazards in the work area
- confirm status of boiler and related equipment including the fuel supply system, ash removal and services
- demonstrate purge procedure
- conduct pre-start checks including checking:
  - feed water supply and system
  - fuel supply system
  - fans and dampers
  - inspection doors
  - boiler valves - operation and position
  - combustion air supply system
  - boiler water level
- liaise with other work areas to advise of boiler status
- demonstrate set up and start up procedures in both manual and automatic modes
- monitor boiler operation including monitoring:
  - steam reticulation line pressure
  - boiler steam pressure
  - steam supply/usage
  - condensate tank level
  - bagasse levels
  - feedwater levels and pressure
  - fuel levels
  - boiler load
  - water quality
  - furnace pressure
  - ash pit level and removal system
  - balance draft system
  - superheater temperature
  - drum levels
  - equipment condition
- conduct water quality test
- take corrective action in response to out-of-specification results

- report and/or record corrective action as required
- demonstrate shift handover procedure and confirm that replacement operators are aware of all relevant issues prior to completing handover
- demonstrate procedure to take boiler off line
- demonstrate procedure to shut down and clean the boiler
- demonstrate removal of valves and fittings to prepare the boiler for inspection
- demonstrate procedure to store boiler
- demonstrate emergency procedures and related re-start including use of emergency fuel supply
- maintain workplace records
- maintain work area to meet housekeeping standards

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**Required knowledge includes:**

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**Knowledge of:**

- relevant state OHS legislation, standards and codes of practice relating to work responsibilities
- safe work procedures including awareness of health and safety hazards related to boiler operation and associated control measures
- purpose and limitations of protective clothing and equipment
- hierarchy of hazard control measures
- duty of care of the boiler operator
- purpose and basic principles of combustion and boiler operation including principles of heat transfer and properties of steam
- boiler system layout and steam cycle
- the purpose of purging a boiler
- the effect of fuel quality on boiler operation
- impact of ash removal on efficient boiler operation and impact of sludge water flow
- relationship to other processes including an understanding of the impact of sudden load changes on boiler pressure and plant operation
- purpose and limitations of protective clothing and equipment
- methods used to render equipment safe to inspect, maintain and/or clean including lock-out, tag-out and isolation procedures
- water quality test procedures
- typical causes of water/condensate contamination and corrective action required
- equipment purpose and basic operating principles including high pressure feed pumps, fuel supply system and dual fuel systems as required by boiler type
- operating requirements and parameters
- procedures for responding to emergency situations including safe shutdown procedure
- handover and long term shut down and storage procedures
- cleaning procedures and grate dumping
- environmental issues and controls including an understanding of sludge water usage.
- requirements to liaise/advise related work areas
- housekeeping standards for the work area

- reporting and recording systems including both statutory and workplace requirements

## 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.</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>• confirm status of boiler and related equipment including the fuel supply system, ash removal and services</li> <li>• demonstrate purge procedure</li> <li>• conduct pre-start checks</li> <li>• liaise with other work areas to advise of boiler status</li> <li>• demonstrate set up and start up procedures in both manual and automatic modes</li> <li>• conduct water quality test</li> <li>• take corrective action in response to out-of-specification results</li> <li>• report and/or record corrective action</li> <li>• demonstrate emergency procedures and related re-start</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>• Boiler and related equipment. This includes fuel supply, grate cleaning and ash removal systems</li> <li>• Relevant codes and standards</li> <li>• Operating procedures and related advice on equipment operation</li> <li>• Personal protective clothing and equipment</li> <li>• Communication systems and equipment</li> <li>• Housekeeping standards and procedures</li> <li>• Workplace information recording systems, requirements and procedures</li> </ul>
<p>Method of assessment</p>	<p>Other units of competency relevant to the work role should be assessed in conjunction with this unit. This may include:</p> <ul style="list-style-type: none"> <li>• FDFOP2030A Operate a process control interface</li> </ul>
<p>Guidance information for assessment</p>	<p>To ensure consistency in one's performance, competency should be demonstrated on more than one occasion over</p>



	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>	
<b>Policies and procedures</b>	<p>Work is carried out in accordance with company policies and procedures, licensing requirements, legislative requirements, codes of practice and industrial awards and agreements.</p>
<b>Codes of Practice</b>	<p>Codes of practice include the Sugar Milling Operations Industry Code of Practice.</p>
<b>Workplace information</b>	<p>Workplace information can include</p> <ul style="list-style-type: none"> <li>• Standard Operating Procedures (SOPs) and</li> <li>• manufacturer's specifications</li> </ul>
<b>Boilers [advanced]</b>	<p>Boiler (advanced) covers boilers with any or all of the following features:</p> <ul style="list-style-type: none"> <li>• modulating combustion air supply</li> <li>• modulating heat source</li> <li>• superheaters</li> <li>• and economisers</li> </ul> <p>However advanced boilers must also have multiple fuel types which may be fired simultaneously during normal operation. This does not include boilers that change fuel type during start sequence.</p>
<b>Equipment operation and monitoring</b>	<p>Operation and monitoring of equipment and processes typically requires the use of control panels and systems.</p>
<b>Hazards</b>	<p>Hazards typically include</p> <ul style="list-style-type: none"> <li>• working around hot surfaces,</li> <li>• manual handling,</li> <li>• steam, hot gasses and fuel leaks</li> </ul>
<b>Services</b>	<p>Services can include</p> <ul style="list-style-type: none"> <li>• fuel supply of bagasse, coal, gas, oil or other fuel types</li> <li>• steam</li> <li>• mill and instrumentation air</li> <li>• cooling water</li> <li>• general mill water supply and</li> </ul>

	<ul style="list-style-type: none"><li>• cooling water</li></ul>
<b>Equipment status</b>	Confirming equipment status involves <ul style="list-style-type: none"><li>• conducting relevant pre-start checks</li><li>• confirming that housekeeping standards are met, all safety guards are in place and</li><li>• equipment is operational</li></ul>
<b>Internal cleaning</b>	Internal cleaning is carried out in accordance with statutory requirements regarding confined space entry and does not typically include chemical cleaning.
<b>Teamwork</b>	Work may require the ability to work within a team environment.
<b>Information systems</b>	Information systems may be print or screen based.

## Unit Sector(s)

Sugar Milling