



Australian Government

PMAOPS323 Operate and monitor heating furnace

Release: 1

PMAOPS323 Operate and monitor heating furnace

Modification History

Release 1. Supersedes and is equivalent to PMAOPS323A Operate and monitor heating furnace

Application

This unit of competency covers the skills and knowledge required to operate and monitor a fired heating furnace and ancillary equipment.

This unit of competency applies to operations technicians who are required to demonstrate a significant understanding of the process and the equipment operation in order to identify and rectify operational problems, predict the potential impact of the heating furnace on the operation of the whole plant, and facilitate output changes within legislative and other requirements.

The unit applies to furnaces used for heating heat transfer fluids which may include natural and synthetic oils or other media and other industrial uses as required in the workplace. It applies to furnaces that are:

- singular or in a battery of furnaces
- modulating combustion air supply
- modulating single heat source
- modulating firing rate.

This unit of competency applies to an individual operating independently in a plant with local control or in liaison with the control room operator in a plant with a centralised control panel, such as distributed control system (DCS) type controls. In the case of large complex plant, the operations technician would be part of a team during start-up and shutdown procedures.

This unit of competency applies to an individual working alone or as part of a team or group and working in liaison with other shift team members and the control room operator, as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Operations

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|--|-----|--|
| 1 | Prepare for work | 1.1 | Receive and give shift handover |
| | | 1.2 | Identify work requirements |
| | | 1.3 | Identify and control hazards |
| | | 1.4 | Coordinate with appropriate personnel |
| | | 1.5 | Check for recent work undertaken on furnace |
| | | 1.6 | Note any outstanding/incomplete work |
| | | 1.7 | Check operational status of furnace |
| | | | |
| 2 | Start up furnace | 2.1 | Perform pre-start-up checks |
| | | 2.2 | Start up individual items of equipment and the entire furnace system |
| | | 2.3 | Start up from standby and after maintenance |
| | | 2.4 | Increase temperature steadily with no surges or lulls |
| | | 2.5 | Stabilise furnace to produce required heat within required time |
| | | | |
| 3 | Monitor and control the heating furnace | 3.1 | Complete routine checks, logs and paperwork |
| | | 3.2 | Recognise the signs of potential and actual problems |
| | | 3.3 | Take action to minimise the impact of potential and actual problems |
| | | 3.4 | Monitor condition of heat transfer components (if any) |

- and take action required by procedures
- 3.5 Monitor fuel/air supplies and ratios and take action in accordance with procedures
- 3.6 Trim furnace in accordance with procedures
- 4 **Change heating rates**
- 4.1 Predict from rates and schedule when a transition will be required
- 4.2 Give advanced notice of transition to work team
- 4.3 Trim plant in a manner which prepares it for the change
- 4.4 Manage changes smoothly and in a timely manner
- 5 **Maintain furnace effectiveness**
- 5.1 Monitor furnace and its component plant items frequently and critically throughout shift using measured/indicated data and senses
- 5.2 Describe impacts of any changes upstream and downstream
- 5.3 Recognise actual and developing situations which may require action
- 5.4 Apply operational knowledge to resolve problems
- 5.5 Take other appropriate actions on abnormal situations which cannot be resolved during the shift to ensure safety and the resolution of the situation
- 5.6 Follow through items initiated until final resolution has occurred
- 6 **Shut down furnace**
- 6.1 Determine type of shutdown required
- 6.2 Give advance warning of shutdown where possible
- 6.3 Changeover individual items of equipment
- 6.4 Shut down individual items of equipment and the entire furnace system

- 6.5 Shut down to a stand-by condition, if required
 - 6.6 Shut down in an emergency, when required.
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- 7 **Isolate and de-isolate furnace system and individual items**
 - 7.1 Isolate furnace system and or any component plant item
 - 7.2 Make safe for required work
 - 7.3 Check furnace/plant item is ready to be returned to service
 - 7.4 De-isolate and prepare furnace/plant item for return to service

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Regulatory framework

The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used, and include one or more of the following:

- legislative requirements, including work health and safety (WHS)
- industry codes of practice and guidelines
- environmental regulations and guidelines
- Australian and other standards
- licence and certification requirements

All operations to which this unit applies are subject to stringent health, safety and environment (HSE) requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Hazards

Hazards include one or more of the following:

- electricity
- gas
- gases and liquids under pressure
- structural hazards
- structural collapse
- equipment failures
- industrial (machinery, equipment and product)
- equipment or product mass
- noise, rotational equipment or vibration
- plant services (steam, condensate and cooling water)
- working at heights, in restricted or confined spaces, or in environments subjected to heat, noise, dusts or vapours
- flammability and explosivity
- hazardous products and materials
- unauthorised personnel
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- extreme weather

- other hazards that might arise

Situations requiring action

Situations requiring action include one or more of the following:

- fuel variations (rate and quality)
- heating requirements change
- coke, soot and scale build up
- flame pattern
- weather conditions

Non-routine problems

Non-routine problems are unexpected problems, or variations of previous problems and must be resolved by applying operational knowledge to develop new solutions, either individually or in collaboration with relevant experts, to:

- determine problems needing action
- determine possible fault causes
- develop solutions to problems which do not have a known solution
- follow through items initiated until final resolution has occurred
- report problems outside area of responsibility to designated person

Operational knowledge includes one or more of the following:

- procedures
- training
- technical information such as journals, engineering specifications
- remembered experience
- relevant knowledge obtained from appropriate people.

Start up/shut down

Start up/shut down includes the following:

- start up and shut down to/from normal operating conditions
- start up and shut down to/from isolated, cold or empty
- start up and shut down to/from other conditions/situations experienced on the plant

Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, include one or more of the following:

- emergency procedures

- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant

Operate

Operate is to monitor, adjust/make change to the production unit and/or its component items to meet specifications, by one or both of the following:

- manually in the plant
- using local controller in the plant

This competency does not require the operation of a central control panel.

Product

Product includes anything produced by a process step and so includes:

- intermediate products, such as the product from one process step, which then becomes the feed for another

Pre-operational checks

Pre-operational checks include one or more of the following:

- heat exchange fluid feed supply
- fuel supply/heat source
- furnace valves - their operation and position
- combustion air supply and combustion equipment

Ancillary equipment

Ancillary equipment includes one or more of the following:

- economiser
- economiser relief valves
- air heater
- feed heater
- main heating fluid stop valve
- feed pumps
- fans

Monitor

Monitor includes one or more of the following systems and conditions:

- heating fluid pressure and temperature
- flame and combustion conditions
- heating fluid feed and return systems
- fuel system
- combustion management system
- heating fluid management system
- heating fluid manifold fittings
- soot blowers

Unit Mapping Information

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Links

MSA Training Package Implementation Guides - <http://mskills.org.au/training-packages/info/>