



Australian Government

PMC552030 Operate a firing kiln

Release: 1

PMC552030 Operate a firing kiln

Modification History

Release 1. Supersedes and is equivalent to PMC552030C Operate a firing kiln.

Application

This unit of competency covers the skills and knowledge required to operate a firing kiln and ancillary equipment that is integral to the process. It applies to large production contexts and smaller craft contexts.

This unit of competency applies to operators who are required to prepare the firing equipment, load and stack products, monitor and adjust kiln operation and rectify routine problems.

This unit of competency does not apply to forming, drying prior to firing, finishing or operation of rotary kilns.

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, team leader and supervisor, 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

Not applicable

Elements and Performance Criteria

Elements describe the essential outcomes.

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

1	Prepare the firing equipment	1.1	Determine the firing requirements from the production program
		1.2	Identify and set up the kiln cars or furniture
		1.3	Ensure kiln refractories are within specification, including kiln cars, kiln lining and refractories at

- burners, as appropriate
- 1.4 Ensure the firing equipment is safe to use
 - 1.5 Check for fuel feed obstructions and clear burner pathways
- 2 **Load kiln**
- 2.1 Ensure products are set or stacked to specification
 - 2.2 Ensure correct stacking pattern is used
 - 2.3 Ensure adequate space is allowed around each item
 - 2.4 Use kiln space effectively
- 3 **Monitor kiln operation**
- 3.1 Monitor kiln firing to ensure temperature rise and fall rate is to specification
 - 3.2 Monitor and record kiln car movement, or kiln contents
 - 3.3 Monitor and adjust kiln heating equipment (elements or burners) and record temperature gradient details
 - 3.4 Monitor the kiln atmosphere
 - 3.5 Monitor for correct operation of kiln
 - 3.6 Move kiln car or kiln contents to the appropriate storage area
 - 3.7 Check and record condition of products leaving the kiln
- 4 **Rectify routine problems**
- 4.1 Identify the range of faults that can occur during the operation
 - 4.2 Determine and rectify fault causes in accordance with procedures/work instructions
 - 4.3 Identify and rectify equipment failure causes in accordance with procedures/work instructions
 - 4.4 Ensure appropriate records and log books of equipment operations are maintained to meet procedures/work instructions

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| | | 4.5 | Identify non-routine problems and report to designated person |
| 5 | Control hazards | 5.1 | Identify hazards in kiln work area |
| | | 5.2 | Assess the risks arising from those hazards |
| | | 5.3 | Implement measures to control those risks in line with procedures and duty of care |

Foundation Skills

This section describes those required skills (language, literacy and numeracy) 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.

Applicable legislation, regulations, standards and codes of practice include:

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, equipment and production processes and hazardous materials
- Australian/international standards relevant to the materials being used and products being made
- any relevant licence and certification requirements.

All operations to which this unit applies are subject to stringent 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 such

requirements the legislative requirements take precedence.

Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or any combination of:

- job cards
- 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.

Tools and equipment

Tools and equipment include:

- firing kiln
- programmable logic controllers (PLC), if fitted
- instrument panels (local)
- measuring and recording equipment
- kiln cars, racking or other kiln furniture
- ancillary equipment that is integral to the process.

Problems/known solutions

Routine problems must be resolved by applying known solutions.

Routine problems/known solutions are predictable and include one or more of:

- ensuring moisture content of product prior to firing is within specification
- furnace temperature profile variations
- drying variations
- distribution of product in kiln or on kiln car
- correct transition through quartz inversion, as appropriate
- distortion of refractories or mechanical failures.

Known solutions are drawn from one or more of:

- procedures
- training
- remembered experience.

Non-routine problems must be reported according to according to relevant procedures.

Hazards

Hazards must be identified and controlled. Identifying hazards requires consideration of:

- high temperatures
- smoke, dust, vapours or other atmospheric hazards
- weight, shape, volume of materials to be handled
- hazardous products and materials
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- electricity
- gas
- gases and liquids under pressure
- noise
- rotational equipment or vibration
- plant services (steam, condensate, cooling water, etc)
- structural hazards
- equipment failures
- machinery, equipment and product mass
- limited head spaces or overhangs
- working at heights
- working in restricted or confined spaces
- other hazards that might arise.

Records and reports

Records include one or more of:

- log books/sheets
- electronic records
- job/work sheets
- other records used for the smooth running of the plant.

Reports include one or more of:

- paper or electronic-based logs and reports
- verbal/radio reports
- reporting items found which require action.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMC552030C Operate a firing kiln.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=45a7f1d5-61a5-447a-9688-7abbd7e1a5c7>

Assessment Requirements for PMC552030 Operate a firing kiln

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and demonstrate the ability to:

- set up, configure, start and operate the firing equipment according to procedures
- monitor and adjust the equipment to meet product quality and production output specifications
- load and stack products into kiln
- identify hazards and apply relevant hazard controls
- apply safety procedures
- recognise out-of-specification products, process problems and materials faults
- recognise routine and non-routine problems
- identify when the operator is able to rectify problems, when assistance is required and who is the appropriate source for assistance
- take action to resolve problems or report them to appropriate personnel
- distinguish between possible causes of routine problems, including:
 - raw material variations
 - mechanical abnormalities
 - electrical/instrument reading variations
 - process abnormalities
- communicate effectively with team/work group and supervisors
- read and interpret product specifications, job sheets, procedures, material labels and safety information
- complete workplace records
- do basic arithmetical manipulations, including additions, subtractions, divisions, fractions and percentages.

Knowledge Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to operate under routine only supervision and to solve routine problems, including knowledge of:

- principles of firing process
- functions, limitations and principles of operation of firing equipment
- composition and nature of raw materials and finished product
- importance of stacking patterns
- stages and critical transitions during the firing process

- basic physics, and where appropriate chemistry, relevant to the equipment/process/materials
- the potential effects of variations in raw materials and process conditions in relation to quality of product/output
- factors which may affect product quality or production output and appropriate remedies
- routine problems, their probable causes and relevant corrective actions
- organisation procedures relevant to the work environment/job role
- hierarchy of control
- hazards that may arise in the job/work environment and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence shall be based on a holistic assessment of the evidence.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant
 - will typically include a supervisor/third-party report or other evidence, focussing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the use of an appropriate industrial item/s of equipment requiring demonstration of operation, start-up and shutdown procedures and responding to problems
 - may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from demonstration of skills and one or more of:
 - walk-throughs
 - pilot plant operation
 - industry-based case studies/scenarios
 - ‘what ifs’.

- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process such as workbooks, written assessments or interviews (provided a record is kept).
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition the assessor or anyone acting in subject matter expert role in assessment shall demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they shall assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
 - appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on the job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

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