



Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS202B Operate fluid mixing equipment

Release: 1

PMAOPS202B Operate fluid mixing equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the operation of the range of fluid mixers found in fluid processing plants. This competency is typically performed by all operators using mixing equipment.
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Application of the Unit

Application of the unit	In a typical scenario an operator uses a baffled mixing tank (or other mixer) to make a product to specification. This covers the loading of liquid and perhaps solid materials into the mixing equipment. In this example the operator monitors the mixing to ensure the components are dispersed appropriately and checks the resulting product to ensure it complies. This unit does not cover mixing which is part of the preparation of materials (see <i>PMAOPS105C Select and prepare materials</i>) nor the incidental mixing which occurs in a reaction vessel (see <i>PMAOPS220B Monitor chemical reactions in the process</i> or <i>PMAOPS302B Operate reactors and reactor systems</i>) or in-line mixers (see <i>PMAOPS201B Operate fluid flow equipment</i>).³ The operator would: • identify and report operational problems • be aware of and contribute to a safe working environment • contribute to the safe and productive operation of the equipment • operate, monitor and maintain equipment using relevant procedures. Generally the operator would be part of a team during start up and shut down procedures and would be expected to be capable of demonstrating competence in all parts of this unit. At all times they would be liaising and cooperating with other members of the team.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
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Employability Skills Information

Employability skills	This unit contains employability skills.
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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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work.	1.1. Identify work requirements 1.2. Identify and control hazards 1.3. Coordinate with appropriate personnel
2. Prepare mixing equipment.	2.1. Identify type of fluid mixer 2.2. Identify appropriate applications for the mixer type 2.3. Check materials.
3. Operate fluid mixing equipment.	3.1. Charge materials 3.2. Start up/shut down fluid mixing equipment as required 3.3. Adjust mixing conditions as required 3.4. Check product 3.5. Adjust product as instructed or to procedure 3.6. Discharge product 3.7. Complete routine checks and reports, taking action on unexpected readings and trends.
4. Isolate and de-isolate plant.	4.1. Isolate plant 4.2. Make safe for required work 4.3. Check plant is ready to be returned to service 4.4. Prepare plant for return to service.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- efficient and effective operation of plant/equipment
- hazard analysis
- completing plant records
- communication
- problem solving.

Required knowledge

Understanding of fluid mixing equipment and its integral equipment to a level needed to recognise and resolve operational problems. In particular it includes a knowledge of:

- all items on a schematic of the mixing system and the function of each
- fluid mixing principles, such as shear, viscosity and concepts of uniformity
- principles of operation of fluid mixing equipment
- physics of operation
- correct methods of starting, stopping, operating and controlling mixing equipment
- typical mixing problems, and their causes and remedy, within operator's scope of skill level and responsibility
- duty of care
- materials safety data sheets (MSDSs)
- HAZCHEM symbols and codes
- hazardous substances regulations
- spill containment and disposal procedures
- procedures related to this competency
- environmental requirements related to waste disposal
- workplace hazards and methods of controlling hazards.
- hierarchy of control
- communication protocols, eg radio, phone, computer, paper, permissions/authorities
- routine problems, faults and their resolution
- relevant alarms and actions
- plant process idiosyncrasies
- corrective action appropriate to the problem cause
- function and troubleshooting of major components and their problems (such as impellers, seals or bearings)
- types and causes of mixing problems within operator's scope of skill level and responsibility.

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.

Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.

Consistent performance should be demonstrated. In particular look to see that:

- early warning signs of equipment/processes needing attention or with potential problems are recognised
- the range of possible causes can be identified and analysed and the most likely cause determined
- appropriate action is taken to ensure a timely return to full performance
- obvious problems in related plant areas are recognised and an appropriate contribution made to their solution.

These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world,

EVIDENCE GUIDE	
	hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. Consider co-assessment with units about: • measurements • housekeeping • communication. In a major hazard facility, it may be appropriate to assess this unit concurrently with: • <i>MSAPMOHS200A Work safely.</i>
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the communication ability, language and literacy capacity of the assessee and the work being performed.

Range Statement

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. Add any 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.

Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	Fluid mixing processes can vary from continuous mixing processes as typically found in oil plants to batch mixing as commonly used in chemical plants and paint manufacture. It covers the mixing of two or more materials to make a product.
Equipment	This competency includes items of equipment such as: • mixers for low, medium and high viscosity fluids • jet mixing • top and side entry mixers • propeller, and pitched and square bladed turbine impellers.
Problems	Typical problems include incorrect: • mixing time • power consumption • uniformity • vortexing • aeration.
Remedial actions	Remedial actions include changing: • position and angle of baffles where appropriate • impellor (angle, size, shape or speed) • feed rate of fluids.
Mixing conditions	Mixing conditions may be adjusted by: • baffles • mixer speed • mixing duration • other means
Start up shut down as required	Start up shut down as required includes: • start up and shut down to/from normal operating conditions • start up and shut down to/from isolated, cold, empty

RANGE STATEMENT	
	all other conditions experienced on the plant. ie from any condition to any condition experienced on the plant.
Appropriate action	Appropriate action includes: - determining problems needing action - determining possible fault causes - rectifying problem using appropriate solution within area of responsibility - following through items initiated until final resolution has occurred - reporting problems outside area of responsibility to designated person.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: - all work instructions - standard operating procedures - formulas/recipes - batch sheets - temporary instructions - any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State 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.

Unit Sector(s)

Unit sector	Operational/technical
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		
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