



Australian Government

PMAOPS341 Operate and troubleshoot cryogenic processes

Release: 1

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Modification History

Release 1. Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS340 Operate cryogenic processes.

Application

This unit describes the skills and knowledge required to operate and maintain a complex refrigeration or cryogenic system.

This unit applies to autonomous operators who are required to demonstrate a significant understanding of the process and the equipment operation in a plant with local control, or in liaison with the control-room operator in a plant with a centralised control panel. In the case of a large, complex plant, the operations technician would be part of a team during startup and shutdown procedures.

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

No licensing or certification requirements exist at the time of publication. Relevant legislation, industry standards and codes of practice within Australia must be applied.

Pre-requisite Unit

Nil

Competency Field

Operations

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Operate cryogenic system according to procedures	1.1 Receive and give shift handover 1.2 Communicate with personnel to identify and coordinate work requirements 1.3 Identify, control and report process system hazards 1.4 Check for recent work undertaken on cryogenic system and address

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	outstanding and incomplete work 1.5 Check operational status of process system 1.6 Perform routine checks and complete logs and paperwork, taking action on unexpected readings 1.7 Adjust process system according to agreed operational parameters
2. Identify and respond to abnormal situations during operation	2.1 Monitor cryogenic system frequently and critically throughout shift using own senses, and measured and indicated data 2.2 Monitor field data and instrumentation to ensure that product remains on specification 2.3 Identify impacts of changes upstream and downstream 2.4 Identify actual and developing situations that may require action 2.5 Take action to remedy abnormal situations according to operating procedures 2.6 Complete required documents outlining abnormal situation management and corrective action taken
3. Shut down and prepare cryogenic system for maintenance	3.1 Prepare process system to be shut down according to operating procedures 3.2 Complete pre-shutdown checks according to operating procedures 3.3 Shut down process system according to operating procedures 3.4 Identify, control and report shutdown hazards 3.5 Monitor shutdown and identify abnormal situations that may require action 3.6 Take action to remedy abnormal situations according to operating procedures 3.7 Shut down and changeover duty and standby equipment according to operating procedures 3.8 Isolate process system from energy sources
4. Prepare and start up cryogenic system	4.1 De-isolate and prepare process system to be returned to standby or service 4.2 Complete pre-start checks according to operating procedures 4.3 Start up process system according to operating procedures 4.4 Identify, control and report startup hazards

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	4.5 Monitor startup and identify abnormal situations that may require action 4.6 Take action to remedy abnormal situations according to operating procedures

Foundation Skills

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

- Learning skills to follow instructions, monitor process and select appropriate procedure.
- Reading skills to follow written procedures and documentation.
- Writing skills to complete workplace documentation.
- Oral communication skills to liaise and coordinate with team members and the control-room operator.
- Numeracy skills to monitor field data, instrumentation and process parameters.

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

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMAOPS340 Operate cryogenic processes.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=9fc2cf53-e570-4e9f-ad6a-b228ffdb6875>

Assessment Requirements for PMAOPS341 Operate and troubleshoot cryogenic processes

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit:

- at least 2 times, each in a separate work context, for a complex refrigeration or cryogenic system.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- all items on a schematic of the cryogenic system, including:
 - principles of operation of items of equipment in the system, and the basis of cryogenic operations
 - type of cryogenic plant, the component plant items and their functions
 - operating parameters and integrity limits, and product specifications and tolerances including temperature, pressure and flow
 - procedures for starting, stopping, operating, controlling and isolating the system
 - process control philosophies and strategies, and methods of controlling refrigeration systems (including pressure regulation)
 - functions of major components and troubleshooting techniques
- physics to the level of being able to provide an overview of the science of the cryogenic process
- types of industrial refrigerants and their applications, including self-refrigerants, brittle fracture, stress limits and the effects of thermal shock on materials of construction, vaporisation, condensation and impact on process
- cryogenic process abnormal situations and required action, including but not limited to:
 - operating temperatures not maintained
 - unstable or suboptimal operation (icing, moisture and fouling)
 - critical variables and outputs out of range
- hierarchy of control
- refrigeration and cryogenic system hazards:
 - possible causes
 - potential consequences

- appropriate risk controls
- escalation and reporting procedures.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - industrial cryogenic system
 - operating procedures
- abnormal situations must be relevant to cryogenic systems.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

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