Australian Government

PMAOPS205 Operate heat exchangers

Release: 1

PMAOPS205 Operate heat exchangers

Modification History

Release 1. Supersedes and is equivalent to PMAOPS205B Operate heat exchangers

Application

This unit of competency covers the skills and knowledge required to operate heat exchangers.

This unit of competency applies to operators who are required start up and shut down heat exchangers in accordance with procedures, make adjustments to flow rate, temperature and pressure, as required, and solve heat exchanger problems.

This unit of competency applies to an individual who may work alone although under routine direction and supervision. They may work as part of a team or group and will work in liaison with other shift team members and the control room operator, as appropriate.

This unit of competency applies to all heat exchangers, examples include:

- plate
- Utube
- spiral
- bayonet
- air cooled fin
- shell and tube (all variants of design)
- scraped surface
- vessel jackets/coils.

This unit of competency does not cover superheaters or waste heat boilers, which are treated as part of steam generating equipment.

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.	
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 plant item
		1.6	Note any outstanding/incomplete work
		1.7	Check operational status of heat exchanger
2	**Operate heat exchangers in accordance with procedures**	2.1	Identify the type of heat exchanger and duty
		2.2	Adjust flow rates, temperatures and pressure as appropriate to type of heat exchanger and duty
		2.3	Complete routine checks, logs and paperwork, taking action on unexpected readings and trends
3	**Recognise and take action on abnormal situations in accordance with procedures**	3.1	Monitor heat exchanger frequently and critically throughout shift using measured/indicated data and senses
		3.2	Identify impacts of any changes upstream and downstream
		3.3	Recognise situations which may require action
		3.4	Resolve routine problems
		3.5	Take actions on other abnormal situations to make safe and have the situation resolved
4	**Isolate and**	4.1	Complete any required pre-start checks

de-isolate equipment	4.2	Start up/shut down/changeover heat exchanger according to the plant type and duty in liaison with other personnel
	4.3	Isolate plant
	4.4	Make safe for required work
	4.5	Check plant is ready to be returned to service
	4.6	De-isolate and prepare plant 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.

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 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

Hazards

Hazards include one or more of the following:

- dust or other atmospheric hazards
- 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)
- limited head spaces or overhangs
- working at heights, in restricted or confined spaces, or in environments subjected to heat, 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

Heat exchanger duties

Heat exchanger duties include a minimum of one of the following:

- heating
- cooling
- cryogenic
- reboilers
- condensers
- gas dryers

- gas coolers
- refrigeration (evaporators/condensers)

Routine problems

Routine problems must be resolved by applying known solutions.

Routine problems are predictable and include one or more of the following:

- damage to heat exchanger due to overheating and/or under/over pressurising
- factors that affect heat exchanger efficiency (scale build-up, fouling, internal leakage, air lock, turbulence and corrosion)
- leakage or gasket problems
- recognising when maintenance is required

Known solutions are drawn from one or more of the following:

- procedures
- training
- remembered experience

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

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 or empty
- start up and shut down to/from other conditions/situations experienced on the plant

Resolve routine problems

Resolving routine problems includes one or more of the following:

- making adjustments
- carrying out minor maintenance
- identifying and reporting problems outside operator’s scope of responsibility
- identifying and controlling hazards related to heat exchangers and their integral equipment, including pressure vessels

Action

Action in accordance with procedures includes the following:

- 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

Operate Operate is to monitor, adjust/change the plant item/unit/system to meet specifications, by one or more of the following:

- manually in the plant
- using local controller in the plant
- using the process control system in the control room

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=9fc2cf53-e570-4e9f-ad6a-b228ffdb6875