



PMA Chemical, Hydrocarbons and Refining Training Package

Companion Volume Implementation Guide Release 2.3
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1. Introduction

Who is this guide for?

The PMA Companion Volume Implementation Guide is designed to assist State Training Authorities (STAs), regulators, assessors, trainers, Registered Training Organisations (RTOs) and enterprises in delivering training based on the units and qualifications in the PMA Chemical, Hydrocarbons and Refining Training Package.

It has been developed to assist RTOs in meeting the requirements of the *Standards for Registered Training Authorities (RTOs) 2015*.

2. Overview information

PMA version control and modification history

TP release	Status	Release date	Approval process
2.3	Current	28 September 2022	Minor upgrade
2.2	Superseded	29 March 2022	Minor upgrade
2.1	Superseded	05 May 2021	Minor upgrade
2.0	Replaced	16 November 2020	Endorsement
1.0	Replaced	2 June 2016	Endorsement

Summary of changes from Release 2.2 to Release 2.3

Release 2.3 of the PMA Chemical, Hydrocarbons and Refining Training Package reinstated ten PMASMELT coded units that were removed in Release 2.1:

- PMASMELT260 Form carbon anodes
- PMASMELT261 Bake carbon anodes
- PMASMELT262 Clean and strip anode rods
- PMASMELT263 Spray carbon anodes
- PMASMELT264 Start up reduction cells
- PMASMELT266 Deliver molten metal
- PMASMELT267 Cast ingots
- PMASMELT268 Operate vertical direct casting process
- PMASMELT269 Operate cell tending equipment
- PMASMELT270 Supply product from reduction cells.

Summary of changes from Release 2.1 to Release 2.2

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PMA Companion Volume Implementation Guide R2.3 – September 2022

Release 2.2 of the PMA Chemical, Hydrocarbons and Refining Training Package updated the imported unit HLTAID003 to HLTAID011 and the prerequisites that included the Provide First Aid unit, as directed by the Australian Industry and Skills Committee (meeting 1 December 2021).

Summary of changes from Release 2.0 to Release 2.1

Release 2.1 of the PMA Chemical, Hydrocarbons and Refining Training Package removed low use units from the training package as determined at the December 2020 AISC meeting in response to Skills Ministers' objectives.

Thirty seven (37) units deleted:

- PMAOMIR449 Monitor legal compliance obligations during incidents
- PMAOMIR523 Manage corporate media requirements in a crisis
- PMAOMIR575 Coordinate welfare support activities in response to an incident
- PMAOMIR622 Build partnerships to improve incident response capacity
- PMAOPS211 Operate manufacturing extrusion systems
- PMAOPS242 Moor ships for transfer of bulk processed particulates or fluids
- PMAOPS263 Operate leaching equipment
- PMAOPS265 Operate magnetic/electrical separation equipment
- PMAOPS290 Operate a biotreater
- PMAOPS360 Operate a metalliferous kiln/furnace
- PMAOPS361 Operate a smelting furnace
- PMAOPS362 Operate a blast furnace
- PMAOPS364 Operate an electrochemical process
- PMAOPS365 Operate pelletising equipment
- PMAOPS366 Operate sintering equipment
- PMAOPS550 Develop a colour formulation
- PMAOPS560 Plan and design tailings management facilities
- PMAOPS751 Apply physiochemical knowledge to select raw materials for surface coatings
- PMAOPS752 Develop a decorative coating
- PMAOPS753 Develop a non-decorative coating or ink
- PMAOPS755 Provide surface coatings application advice
- PMASMELT260 Form carbon anodes
- PMASMELT261 Bake carbon anodes
- PMASMELT262 Clean and strip anode rods
- PMASMELT263 Spray carbon anodes

- PMASMELT264 Start up reduction cells
- PMASMELT266 Deliver molten metal
- PMASMELT267 Cast ingots
- PMASMELT268 Operate vertical direct casting process
- PMASMELT269 Operate cell tending equipment
- PMASMELT270 Supply product from reduction cells
- PMASUP347 Undertake corrosion inspection on process plant
- PMASUP432 Coordinate pipeline projects
- PMASUP620 Manage environmental management system
- PMAWHS221 Maintain first aid resources and records
- PMAWHS321 Provide first aid response in remote and/or isolated area
- PMAWHS420 Develop first aid procedures and manage resources

Summary of changes from Release 1.0 to Release 2.0

Release 2.0 of the PMA Chemical, Hydrocarbons and Refining Training Package includes the following changes:

- **Endorsed components**
 - 27 revised units
 - 20 new units
 - Seven specialisations added to the Certificate III in Process Plant Operations, packaging rules amended and a reduced number of units listed in the elective bank.
- **Non-endorsed components**
 - Certificate II in Process Plant Operations and Certificate IV in Process Plant Technology updated to reflect new unit codes and titles
 - *PMAWHS213 Undertake fire control and emergency rescue* updated to provide clarification around assessment.

Training package mapping of changes

PMA Release 2.3 – Changes to units of competency

10 units of competency reinstated, see appendix 1.

PMA Release 2.2 – Changes to qualifications

E = equivalent N = Not equivalent

Code and Title of Current Release 2.2		Code and Title of Previous Release 2.1			
Code	Title	Code	Title	Comment	E/N
PMA40116	Certificate IV in Process Plant Technology	PMA40116	Certificate IV in Process Plant Technology	Update to electives where first aid units are prerequisites	E

PMA Release 2.2 – Changes to units of competency

HLTAID003 update to HLTAID011 as a pre requisite in PMAOMIR301 and PMAWHS320.

PMA Release 2.1 – Changes to qualifications

E = equivalent N = Not equivalent

Code and Title of Current Release 2.1		Code and Title of Previous Release 2.0			
Code	Title	Code	Title	Comment	E/N
PMA20116	Certificate II in Process Plant Operations	PMA20116	Certificate II in Process Plant Operations	16 elective units deleted.	E
PMA30120	Certificate III in Process Plant Operations	PMA30120	Certificate III in Process Plant Operations	19 elective units deleted.	E
PMA40116	Certificate IV in Process Plant Technology	PMA40116	Certificate IV in Process Plant Technology	27 elective units deleted.	E
PMA50116	Diploma of Process Plant Technology	PMA50116	Diploma of Process Plant Technology	7 elective units deleted.	E
PMA60116	Advanced Diploma of Process Plant Technology	PMA60116	Advanced Diploma of Process Plant Technology	13 elective units deleted.	E

PMA Release 2.1 – Changes to units of competency

37 units of competency deleted, see appendix 1.

PMA Release 2.0 – Changes to qualifications

E = equivalent N = Not equivalent

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
PMA20116	Certificate II in Process Plant Operations	PMA20116	Certificate II in Process Plant Operations	Release 2.0. Elective unit codes and titles updated.	E
PMA30120	Certificate III in Process Plant Operations	PMA30116	Certificate III in Process Plant Operations	Release 2.0. Seven specialisations added, packaging rules amended and	E

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
				number of units in elective bank reduced.	
PMA40116	Certificate IV in Process Plant Technology	PMA40116	Certificate IV in Process Plant Technology	Release 2.0. Elective unit codes and titles updated.	E

PMA Release 2.0 – Changes to units of competency

E = equivalent N = Not equivalent

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
PMAOMIR306	Operate control panel during an emergency	PMAOMIR305	Operate panel during an emergency	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOMIR305 Operate panel during an emergency.	E
PMAOMIR322	Manage incident response information	PMAOMIR320	Manage incident response information	Unit code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment requirements changed. Supersedes and is equivalent to PMAOMIR320 Manage incident response information.	E
PMAOMIR323	Manage communication systems during an incident	PMAOMIR321	Manage communication systems during an incident	Unit code and Application changed. Performance Criteria changed. Range of conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOMIR321 Manage communication systems during an incident.	E
PMAOPS306	Operate and troubleshoot production unit	PMAOPS300	Operate a production unit	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS300 Operate a production unit.	E
PMAOPS310	Operate and troubleshoot distillation system	PMAOPS301	Operate a distillation unit	Release 1. Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is	E

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
				equivalent to PMAOPS301 Operate a distillation unit.	
PMAOPS311	Operate and troubleshoot reactors and reaction equipment	PMAOPS302	Operate reactors and reaction equipment	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS302 Operate reactors and reaction equipment.	E
PMAOPS313	Operate and troubleshoot furnaces to induce reaction	PMAOPS303	Operate furnaces to induce reaction	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS303 Operate furnaces to induce reaction.	E
PMAOPS314	Operate and troubleshoot compressor systems	PMAOPS304	Operate and monitor compressor systems and equipment	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS304 Operate and monitor compressor systems and equipment.	E
PMAOPS315	Operate and troubleshoot process control systems	PMAOPS305	Operate process control systems	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS305 Operate process control systems.	E
PMAOPS316	Organise storage and logistics of general materials	PMAOPS308	Organise storage and logistics of general materials	Unit code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS308 Organise storage and logistics of general materials.	E
PMAOPS317	Undertake ship transfer operations	PMAOPS312	Undertake ship loading/unloading operations	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS312 Undertake ship loading/unloading	E

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
				operations.	
PMAOPS318	Conduct artificial lift	PMAOPS320	Conduct artificial lift	Unit code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS320 Conduct artificial lift.	E
PMAOPS322	Undertake well management	PMAOPS321	Undertake well management	Unit code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS321 Undertake well management.	E
PMAOPS328	Operate and troubleshoot heating furnace	PMAOPS323	Operate and monitor heating furnace	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS323 Operate and monitor heating furnace.	E
PMAOPS331	Operate and troubleshoot gas turbine system	PMAOPS324	Operate a gas turbine	Release 1. Unit code changed and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS324 Operate a gas turbine.	E
PMAOPS332	Generate electrical power	PMAOPS325	Generate electrical power	Unit code and changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS325 Generate electrical power.	E
PMAOPS334	Operate and troubleshoot gas absorption system	PMAOPS326	Operate gas absorption unit	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS326 Operate gas absorption unit.	E
PMAOPS336	Operate and troubleshoot fixed-bed adsorption system	PMAOPS327	Operate fixed bed adsorption unit	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed.	E

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
				Assessment Requirements changed. Supersedes and is equivalent to PMAOPS327 Operate fixed bed adsorption unit.	
PMAOPS337	Operate and troubleshoot liquid extraction system	PMAOPS329	Operate liquid extraction unit	Unit code and title changed. Application and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS329 Operate liquid extraction unit.	E
PMAOPS338	Communicate and monitor pipeline activities	PMAOPS330	Communicate and monitor pipeline activities	Unit code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS330 Communicate and monitor pipeline activities.	E
PMAOPS339	Operate and troubleshoot wells and gathering systems	PMAOPS333	Operate wells and gathering systems	Unit code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS330 Communicate and monitor pipeline activities.	E
PMAOPS341	Operate and troubleshoot cryogenic processes	PMAOPS340	Operate cryogenic processes	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.	E
PMAOPS342	Conduct pipeline pigging	PMAOPS335	Conduct pipeline pigging	Unit Code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS335 Conduct pipeline pigging.	E
PMAOPS343	Transfer bulk fluids into/out of storage facility	PMAOPS307	Transfer bulk fluids into/out of storage facility	Unit code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMAOPS307 Transfer bulk fluids into/out	E

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
				of storage facility.	
PMAOPS344	Operate and troubleshoot flare system			Newly created.	N/A
PMAOPS345	Operate and troubleshoot gas treatment process			Newly created.	N/A
PMAOPS346	Operate and troubleshoot liquefaction process			Newly created.	N/A
PMAOPS347	Create and conduct isolations in the workplace			Newly created.	N/A
PMAOPS348	Operate safety, protection and shutdown systems			Newly created.	N/A
PMAOPS349	Operate and troubleshoot hydraulic systems			Newly created.	N/A
PMAOPS351	Operate and troubleshoot turret swivel systems			Newly created.	N/A
PMAOPS352	Operate and troubleshoot instrument and plant air systems			Newly created.	N/A
PMAOPS353	Operate and troubleshoot heating, ventilation and air conditioning systems			Newly created.	N/A
PMAOPS354	Operate and troubleshoot inert gas generation systems			Newly created.	N/A
PMAOPS355	Operate and troubleshoot fuel systems			Newly created.	N/A
PMAOPS356	Operate and troubleshoot water treatment systems			Newly created.	N/A
PMAOPS357	Operate and troubleshoot produced water and water injection systems			Newly created.	N/A
PMAOPS358	Process design fundamentals			Newly created.	N/A
PMAOPS359	Operate and troubleshoot process			Newly created.	N/A

Code and Title of Current Release 2.0		Code and Title of Previous Release 1.0			
Code	Title	Code	Title	Comment	E/N
	measurement and control systems				
PMAOPS363	Operate and troubleshoot export systems			Newly created.	N/A
PMAOPS367	Operate and troubleshoot cooling water systems			Newly created.	N/A
PMAOPS368	Operate and troubleshoot heating medium/hot oil systems			Newly created.	N/A
PMAOPS369	Operate and troubleshoot drain and vent systems			Newly created.	N/A
PMAOPS370	Operate and troubleshoot condensate stabilisation systems			Newly created.	N/A
PMASUP348	Monitor and maintain cathodic protection systems	PMASUP343	Monitor and maintain cathodic protection systems	Unit Code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMASUP343 Monitor and maintain cathodic protection systems.	E
PMASUP349	Monitor and control repairs and modifications on operational pipe	PMASUP344	Monitor and control repairs and modifications on operational pipe	Unit Code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMASUP344 Monitor and control repairs and modifications on operational pipe.	E
PMASUP350	Control corrosion	PMASUP346	Control corrosion	Unit Code and Application changed. Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMASUP346 Control corrosion.	E
PMAWHS213	Undertake fire control and emergency rescue requires	PMAWHS213	Undertake fire control and emergency rescue requires	Range of Conditions and Knowledge Evidence updated for clarity.	E

Qualifications, Skill Sets and Units of Competency in Training Package Release 2.3

Qualifications

PMA Code	Qualification title
PMA20116	Certificate II in Process Plant Operations
PMA30120	Certificate III in Process Plant Operations
PMA40116	Certificate IV in Process Plant Technology
PMA50116	Diploma of Process Plant Technology
PMA60116	Advanced Diploma of Process Plant Technology

Skill Sets

Skill Sets are defined as single units of competency, or logical clusters of units of competency from an endorsed training package that link to a licence or regulatory requirement or defined critical industry need. Industry has supported the creation of a range of Skill Sets, mainly in safety and incident preparedness and response areas.

Industry manages the competency requirements of its workforce to ensure compliance with regulatory requirements.

PMA Code	PMA Title
PMASS00013	Pipeline liquids transmission
PMASS00014	Pipeline gas transmission
PMASS00015	Workplace assessor, trainer, coach
PMASS00016	Confined space work team
PMASS00017	Contractor induction
PMASS00019	Hot work observer
PMASS00020	Incident response commander
PMASS00021	Incident response team leader
PMASS00022	Incident response team member
PMASS00023	Offshore crane driver
PMASS00024	Offshore incident response team member
PMASS00025	Offshore operator safety induction

PMA Units of Competency

Code	Title	Prerequisites
PMAOMIR210	Control evacuation to muster point	
PMAOMIR301	Undertake initial rescue	MSMWHS216 MSMWHS217 HLTAID011
PMAOMIR302	Respond to a helideck incident	
PMAOMIR306	Operate control panel during an emergency	PMAOPS315
PMAOMIR317	Facilitate search and rescue operations	

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Code	Title	Prerequisites
PMAOMIR322	Manage incident response information	
PMAOMIR323	Manage communication systems during an incident	
PMAOMIR346	Assess and secure an incident site	
PMAOMIR407	Audit incident preparedness and established response systems	
PMAOMIR418	Coordinate incident response	
PMAOMIR424	Develop and maintain community relationships	
PMAOMIR430	Conduct and assess incident exercises	
PMAOMIR444	Develop incident containment tactics	
PMAOMIR512	Establish incident response preparedness and response systems	
PMAOMIR650	Manage a crisis	
PMAOPS101	Read dials and indicators	
PMAOPS105	Select and prepare materials	
PMAOPS201	Operate fluid flow equipment	
PMAOPS202	Operate fluid mixing equipment	
PMAOPS204	Select and use utilities and services	
PMAOPS205	Operate heat exchangers	
PMAOPS208	Operate chemical separation equipment	
PMAOPS210	Operate solids handling equipment	
PMAOPS213	Package product/material	
PMAOPS216	Operate local control system	
PMAOPS217	Operate wet milling equipment	
PMAOPS220	Monitor chemical reactions in the process	
PMAOPS221	Operate and monitor prime movers	
PMAOPS222	Operate and monitor pumping systems and equipment	PMAOPS221 OR PMAOPS331
PMAOPS223	Operate and monitor valve systems	
PMAOPS224	Provide fluids for utilities and support	
PMAOPS226	Monitor and operate flare systems	
PMAOPS230	Monitor, operate and maintain pipeline stations and equipment	
PMAOPS231	Control gas odourisation	
PMAOPS232	Operate filtration equipment	
PMAOPS233	Monitor wells and gathering systems	
PMAOPS234	Monitor and operate low pressure compressors	
PMAOPS236	Monitor continuous process plant	
PMAOPS240	Store fluids in bulk	
PMAOPS241	Operate Joule-Thomson effect device	
PMAOPS246	Operate separation equipment	
PMAOPS247	Operate powered separation equipment	
PMAOPS260	Conduct screening operations	
PMAOPS261	Operate bulk solids loading equipment	
PMAOPS262	Operate digestion equipment	
PMAOPS264	Operate solvent extraction equipment	

Code	Title	Prerequisites
PMAOPS280	Interpret process plant schematics	
PMAOPS306	Operate and troubleshoot production unit	
PMAOPS309	Operate solids handling/storage facility	
PMAOPS310	Operate and troubleshoot distillation system	
PMAOPS311	Operate and troubleshoot reactors and reaction equipment	
PMAOPS313	Operate and troubleshoot furnaces to induce reaction	
PMAOPS314	Operate and troubleshoot compressor systems	
PMAOPS315	Operate and troubleshoot process control systems	
PMAOPS316	Organise storage and logistics of general materials	
PMAOPS317	Undertake ship transfer operations	
PMAOPS318	Conduct artificial lift	
PMAOPS319	Adjust batch	
PMAOPS322	Undertake well management	
PMAOPS328	Operate and troubleshoot heating furnace	
PMAOPS331	Operate and troubleshoot gas turbine system	
PMAOPS332	Generate electrical power	
PMAOPS334	Operate and troubleshoot gas absorption system	
PMAOPS336	Operate and troubleshoot fixed-bed adsorption system	
PMAOPS337	Operate and troubleshoot liquid extraction system	
PMAOPS338	Communicate and monitor pipeline activities	
PMAOPS339	Operate and troubleshoot wells and gathering systems	
PMAOPS341	Operate and troubleshoot cryogenic processes	
PMAOPS342	Conduct pipeline pigging	
PMAOPS343	Transfer bulk fluids into/out of storage facility	
PMAOPS344	Operate and troubleshoot flare system	
PMAOPS345	Operate and troubleshoot gas treatment process	
PMAOPS346	Operate and troubleshoot liquefaction process	
PMAOPS347	Create and conduct isolations in the workplace	PMASUP244
PMAOPS348	Operate safety, protection and shutdown systems	
PMAOPS349	Operate and troubleshoot hydraulic systems	
PMAOPS350	Match and adjust colour	
PMAOPS351	Operate and troubleshoot turret swivel systems	
PMAOPS352	Operate and troubleshoot instrument and plant air systems	
PMAOPS353	Operate and troubleshoot heating, ventilation and air conditioning systems	
PMAOPS354	Operate and troubleshoot inert gas generation systems	
PMAOPS355	Operate and troubleshoot fuel systems	
PMAOPS356	Operate and troubleshoot water treatment systems	
PMAOPS357	Operate and troubleshoot produced water and water injection systems	
PMAOPS358	Process design fundamentals	
PMAOPS359	Operate and troubleshoot process measurement and control systems	
PMAOPS360	Operate a metalliferous kiln/furnace	

Code	Title	Prerequisites
PMAOPS363	Operate and troubleshoot export systems	
PMAOPS367	Operate and troubleshoot cooling water systems	
PMAOPS368	Operate and troubleshoot heating medium/hot oil systems	
PMAOPS369	Operate and troubleshoot drain and vent systems	
PMAOPS370	Operate and troubleshoot condensate stabilisation systems	
PMAOPS390	Operate a biochemical process	
PMAOPS402	Respond to abnormal process situations	MSMSUP390
PMAOPS405	Operate complex control systems	
PMAOPS410	Operate remote production facilities	
PMAOPS411	Manage plant shutdown and restart	
PMAOPS433	Manage wells and gathering systems	
PMAOPS434	Commission wells and gathering systems	
PMAOPS450	Solve colour problems	
PMAOPS460	Monitor and operate tailings management facilities	
PMAOPS500	Optimise production systems	
PMAOPS501	Provide operational expertise to a project team	
PMAOPS505	Control the process during abnormal situations	
PMAOPS511	Determine energy transfer loads	
PMAOPS512	Determine mass transfer loads	
PMAOPS520	Manage utilities	
PMAOPS521	Plan plant shutdown	
PMAOPS522	Coordinate plant shut down	
PMAOPS600	Modify plant	
PMAOPS601	Debottleneck plant	
PMASMELT260	Form carbon anodes	
PMASMELT261	Bake carbon anodes	
PMASMELT262	Clean and strip anode rods	
PMASMELT263	Spray carbon anodes	
PMASMELT264	Start up reduction cells	
PMASMELT265	Operate reduction cells	
PMASMELT266	Deliver molten metal	
PMASMELT267	Cast ingots	
PMASMELT268	Operate vertical direct casting process	
PMASMELT269	Operate cell tending equipment	
PMASMELT270	Supply product from reduction cells	
PMASUP236	Operate vehicles in the field	
PMASUP237	Undertake crane, dogging and load transfer operations	
PMASUP241	Maintain pipeline easements	
PMASUP242	Monitor pipeline civil works	
PMASUP243	Monitor and maintain pipeline coatings	
PMASUP244	Prepare and isolate plant	
PMASUP245	Break and make flanged joints using hand tools	
PMASUP246	Disconnect and reconnect non-flared tube fitting joints	
PMASUP305	Operate offshore cranes	

Code	Title	Prerequisites
PMASUP311	Operate communications hub	
PMASUP341	Monitor and maintain instrument and control systems	MSMPER300
PMASUP342	Monitor and maintain electrical systems	MSMPER300
PMASUP345	Monitor vibration	
PMASUP348	Monitor and maintain cathodic protection systems	
PMASUP349	Monitor and control repairs and modifications on operational pipe	
PMASUP350	Control corrosion	
PMASUP410	Develop plant documentation	
PMASUP420	Minimise environmental impact of process	
PMASUP440	Commission/recommission plant	
PMASUP441	Decommission plant	
PMASUP444	Plan plant preparation and isolation	
PMASUP445	Participate in HAZOP studies	PMAOPS280
PMASUP520	Review procedures to minimise environmental impact of process	
PMASUP540	Analyse equipment performance	
PMAWHS211	Prepare equipment for emergency response	
PMAWHS213	Undertake fire control and emergency rescue	
PMAWHS214	Undertake helicopter safety and escape	
PMAWHS215	Apply offshore facility abandonment and sea survival procedures and practices	
PMAWHS310	Investigate incidents	
PMAWHS311	Lead emergency teams	
PMAWHS312	Command the operation of survival craft	
PMAWHS320	Provide advanced first aid response	HLTAID011
PMAWHS502	Contribute to safety case	
PMAWHS511	Manage emergency incidents	

Imported units of competency

Code	Title	Prerequisites
FBPPHM2001	Follow work procedures to maintain Good Manufacturing Practice requirements	
FBPPHM3001	Apply Good Manufacturing Practice requirements	
HLTAID0011	Provide first aid	
HLTAID0013	Provide first aid in remote situations	
HLTAID0014	Provide advanced first aid	
MEM04001	Operate melting furnaces	MEM11011 MEM13004 MEM13015 MEM16006
MEM05012	Perform routine manual metal arc welding	MEM11011 MEM13015 MEM16006
MEM07033	Operate and monitor basic boiler	MEM11011 MEM13015

Code	Title	Prerequisites
		MEM16006
MEM09002	Interpret technical drawing	MEM12023 MEM12024 MEM13015 MEM16006
MEM09003	Prepare basic engineering drawing	MEM09002 MEM12023 MEM12024 MEM13015 MEM16006
MEM11011	Undertake manual handling	MEM13015 MEM16006
MEM12023	Perform engineering measurements	
MEM12024	Perform computations	
MEM13015	Work safely and effectively in manufacturing and engineering	
MEM16005	Operate as a team member to conduct manufacturing, engineering or related activities	MEM11011 MEM13015 MEM16006
MEM16006	Organise and communicate information	
MEM18011	Shut down and isolate machine/equipment	MEM11011 MEM13015 MEM16006
MSL936003	Maintain quality system and continuous improvement processes within work or functional area	
MSL952001	Collect routine site samples	
MSL954004	Obtain representative samples in accordance with sampling plan	
MSL973013	Perform basic tests	
MSMBLIC001	Licence to operate a standard boiler	
MSMBLIC002	Licence to operate an advanced boiler	
MSMENV172	Identify and minimise environmental hazards	
MSMENV272	Participate in environmentally sustainable work practices	
MSMENV472	Implement and monitor environmentally sustainable work practices	
MSMENV672	Develop workplace policy and procedures for environmental sustainability	
MSMOPS100	Use equipment	
MSMOPS102	Perform tasks to support production	
MSMOPS200	Operate equipment	
MSMOPS212	Use organisation computers or data systems	
MSMOPS400	Optimise process/plant area	
MSMOPS401	Trial new process or product	
MSMPER200	Work in accordance with an issued permit	
MSMPER201	Monitor and control work permits	
MSMPER202	Observe permit work	
MSMPER205	Enter confined space	MSMPER200
MSMPER300	Issue work permits	MSMWHS201

Code	Title	Prerequisites
MSMPER400	Coordinate permit process	MSMPER300
MSMPMC302	Operate equipment to blend/mix materials	
MSMPMC303	Operate grinding equipment	
MSMPMC306	Operate crushing equipment	
MSMPMC324	Move materials	
MSMSUP100	Apply workplace context to own job	
MSMSUP101	Clean workplace or equipment	
MSMSUP102	Communicate in the workplace	
MSMSUP106	Work in a team	
MSMSUP200	Achieve work outcomes	
MSMSUP204	Pack products or materials	
MSMSUP205	Transfer loads	
MSMSUP210	Process and record information	
MSMSUP240	Undertake minor maintenance	
MSMSUP273	Handle goods	
MSMSUP280	Manage conflict at work	
MSMSUP291	Participate in continuous improvement	
MSMSUP292	Sample and test materials and product	
MSMSUP300	Identify and apply process improvements	
MSMSUP301	Apply HACCP to the workplace	
MSMSUP303	Identify equipment faults	
MSMSUP309	Maintain and organise workplace records	
MSMSUP310	Contribute to development of workplace documentation	
MSMSUP330	Develop and adjust a production schedule	
MSMSUP382	Provide coaching/mentoring in the workplace	
MSMSUP383	Facilitate a team	
MSMSUP390	Use structured problem-solving tools	
MSMSUP400	Develop and monitor quality systems	
MSMSUP404	Coordinate maintenance	
MSMSUP405	Identify problems in fluid power system	
MSMSUP406	Identify faults in electronic control	
MSMWHS100	Follow WHS procedures	
MSMWHS110	Follow emergency response procedures	
MSMWHS200	Work safely	
MSMWHS201	Conduct hazard analysis	
MSMWHS205	Control minor incidents	
MSMWHS210	Undertake first response to non-fire incidents	
MSMWHS212	Undertake first response to fire incidents	
MSMWHS216	Operate breathing apparatus	
MSMWHS217	Gas test atmospheres	
MSMWHS218	Control the risks of falls	
MSMWHS300	Facilitate the implementation of WHS for a work group	MSMWHS200
MSMWHS400	Contribute to WHS management system	
MSMWHS401	Assess risk	

Code	Title	Prerequisites
MSMWHS503	Maintain WHS management system	
MSMWHS510	Manage risk	
MSMWHS601	Develop WHS management system	
MSS015022	Develop strategies for more sustainable use of resources	
MSS402002	Sustain process improvements	
MSS402082	Apply cost factors to work practices	
MSS402031	Interpret product costs in terms of customer requirements	
MSS402030	Apply cost factors to work practices	
MSS402040	Apply 5S procedures	
MSS402050	Monitor process capability	
MSS402051	Apply quality standards	
MSS402060	Use planning software systems in operations	
MSS402080	Undertake root cause analysis	
MSS402081	Contribute to the application of a proactive maintenance strategy	
MSS402083	Use planning software systems in operations	
MSS403085	Ensure process improvements are sustained	
MSS403011	Facilitate implementation of competitive systems and practices	
MSS403013	Facilitate holistic culture improvement in an organisation	
MSS403086	Improve cost factors in work practices	
MSS403040	Facilitate and improve implementation of 5S	
MSS403054	Facilitate breakthrough improvements	
MSS403087	Mistake proof an operational process	
MSS404084	Undertake process capability improvements	
MSS404060	Facilitate the use of planning software systems in a work area or team	
MSS404085	Undertake proactive maintenance analyses	
MSS404086	Assist in implementing a proactive maintenance strategy	
MSS405015	Manage relationships with non-customer external organisations	
MSS405084	Manage people relationships	
MSS405016	Manage workplace learning	
MSS405030	Optimise cost of a product or service	
MSS405031	Undertake value analysis of product or process costs in terms of customer requirements	
MSS405040	Manage 5S system in an organisation	
MSS405041	Implement improvement systems in an organisation	
MSS405054	Determine and improve process capability	MSS404054
MSS404052	Apply statistics to operational processes	
MSS405063	Develop the application of enterprise control systems in an organisation	
MSS405064	Determine and establish information collection requirements and processes	
MSS405086	Develop sustainable energy practices	
MSS405081	Develop a proactive maintenance strategy	

Code	Title	Prerequisites
PSPGEN015	Work effectively with diversity	
PSPMGT003	Manage change	
PSPMGT004	Manage diversity	
RIIPBE203D	Conduct precipitation operations	
RIIPBE301D	Conduct calcination activities	
RIIPBE308D	Conduct thickening and clarifying process	
RIIRIS201D	Conduct local risk control	
TAEASS301	Contribute to assessment	
TAEASS401	Plan assessment activities and processes	
TAEASS402	Assess competence	
TAEASS403	Participate in assessment validation	
TAEASS502	Design and develop assessment tools	
TADEL301	Provide work skill instruction	
TLID2010	Operate a forklift	
UEPOPL001	Licence to operate a steam turbine	
UEPOPS319	Operate and monitor gas production plant	

Mapping of PMA Release 2.0 to PMA Release 1.0

Detailed mapping and equivalence tables for the Chemical, Hydrocarbons and Refining Training Package are provided in **Appendix 1**.

Key work and training requirements

The PMA Chemical, Hydrocarbons and Refining Training Package covers a wide range of technical and science-based occupations processing key primary and industrial resources, for either domestic consumption or export. Occupations covered include operators of (fixed) plant through to paraprofessionals whose varied roles cover modifications and optimisation of plant and process and incident prevention, preparedness and response.

The training package addresses the training and recognition needs of operators, technicians and paraprofessionals working in a wide range of sectors and processing a diverse range of materials, including:

- production and processing of natural gas/liquefied natural gas (LNG)
- production and processing of liquefied petroleum gas (LPG)
- coal seam gas (CSG)
- gas transmission/distribution
- oil refining
- manufacture of plastics polymers (polyethylene, polypropylene, vinyl etc.)
- manufacture of fertilisers (nitrogen, phosphorus based etc.)
- manufacture of explosives (for mining)
- processing and beneficiation of metal ores (e.g. iron ore, bauxite)

- production of metals from their ores (e.g. iron, steel, aluminium, copper, gold lead, silicon, manganese)
- production of aeolian gases
- production of soaps, shampoos, detergents and other surfactants
- production of brake fluid
- production of acids, bases and other heavy chemicals (sulphuric, hydrochloric acids, sodium hydroxide etc.)
- production of food-grade chemicals (e.g. for margarine manufacture)
- production of fine and specialty chemicals
- production of paint and pigments
- extraction and processing of essential oils
- manufacture of industrial and fuel alcohol derived from agricultural waste and other sources
- sanitising and sterilising chemicals (e.g. chlorine, ethylene oxide).

A range of factors has driven the need for qualifications in these occupations, the primary one being the potentially hazardous nature of most of the industry, with many sites being declared Major Hazard Facilities (MHF) and the desire to have reliable, zero-incident sites. This, combined with the highly technical nature of most plants, means that industry has always invested in the training of its operators, mainly using internal training. The training package has allowed industry to benchmark its internal competency development against a nationally agreed standard.

This is a science and technology-based industry. Operators are employed to improve the performance of highly sophisticated plants, to anticipate adverse trends and to ensure plant is in optimal condition. They are also required to respond appropriately to contain and recover from any incident that may occur.

Regulation and licensing requirements

No specific licensing or certification requirements apply to this training package or its qualifications at the time of publication. However, regulations and/or external accreditation requirements for industry do exist, so users should always check local requirements. Relevant legislation, industry standards and codes of practice within Australia must also be applied.

3. Implementation information

RTOs will need to implement a comprehensive training and assessment strategy for each PMA qualification that they deliver.

PMA represents a broad industry sector with a diversity of processes used and competencies required. Users must select and customise programs to meet industry and candidate needs.

This implementation information is provided to assist RTOs in developing their learning and assessment strategies to meet industry and candidate needs. It includes information on:

- choosing the appropriate qualification
- choosing electives
- supporting candidates
- delivering the training
- assessing candidates.

Choosing the appropriate qualification

This section provides information about:

- qualification design philosophy
- career pathways
- entry requirements and pathways into and out of qualifications
- qualifications, occupational outcomes and the AQF.

Qualification design philosophy

Core units emphasise safety and environment which are both key issues for this industry.

Sometimes industry incorporates core units into induction programs, or the units are covered early in the training program because the skills are imperative for the work roles.

To achieve a PMA qualification, competence must be achieved in a minimum number of 'technical' units of appropriate complexity. These units are listed as 'Group A' units in the qualification, or in the case of the Certificate III, the Groups that target specialisations.

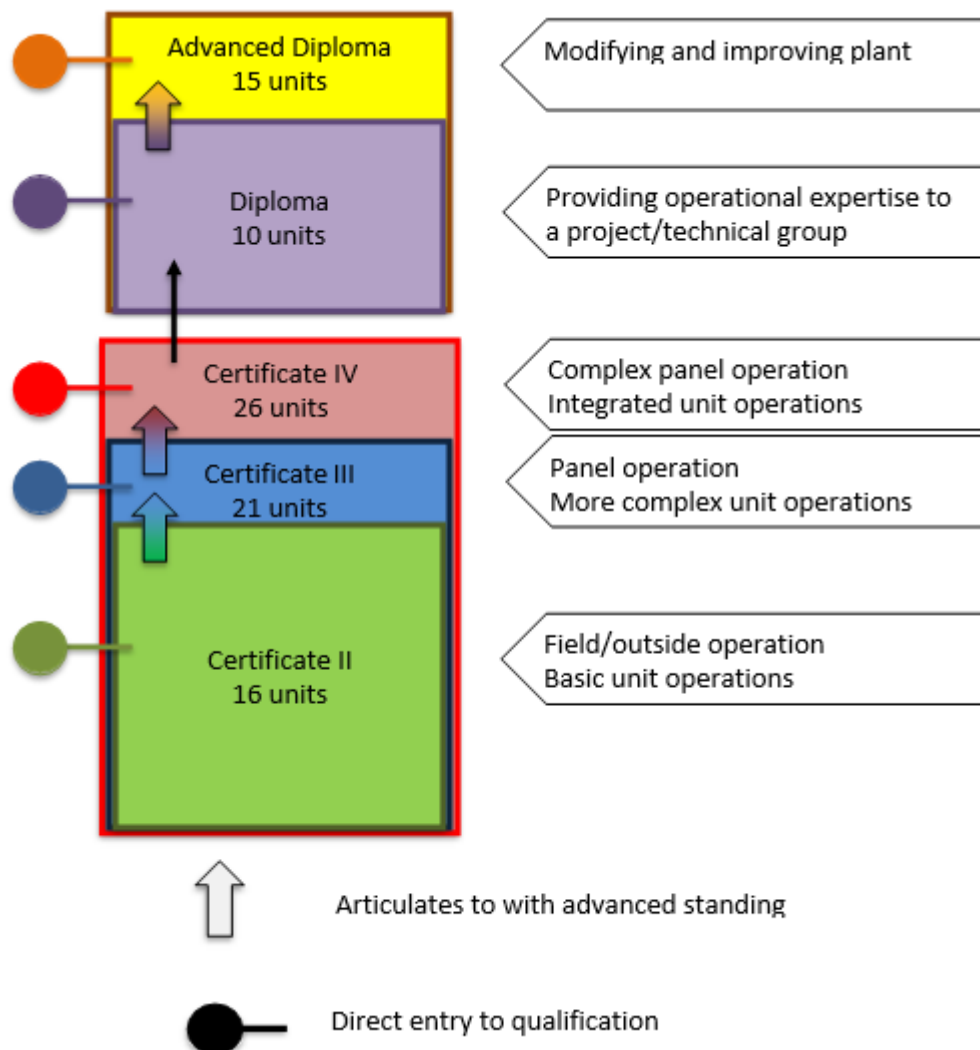
There is also a wide range of other supporting units that reflect the competencies used by an operator. See 'Choosing electives'.

There is a parallel suite of non-technical qualifications in the MSM Manufacturing Training Package.

Career pathways

The PMA qualifications have been developed to simultaneously support career pathways for operations personnel and shape articulation progressively up through the AQF levels.

The following chart shows the career pathways and alignment between the occupational roles and the qualifications. The suite of qualifications ranges from Certificate II to Advanced Diploma, reflecting operational and paraprofessional roles. While the Certificates are accessible to any operator undertaking sufficiently complex operations, the Diploma and Advanced Diploma will normally only be available to those senior operators undertaking project work (or similar) either in conjunction with operation or as a secondment.



Entry requirements and pathways into and out of qualifications

The qualifications in PMA have been designed to support direct entry into qualifications. The qualifications support articulation into the next qualification and into higher education Degree programs.

PMA20116 Certificate II in Process Plant Operations

Pathways into the qualification

There are no entry requirements into this qualification.

MSM10216 - Certificate I in Manufacturing (Pathways) is an appropriate pathway qualification into PMA20116.

Pathways from the qualification

Further training pathways from this qualification include the PMA30120 Certificate III in Process Plant Operations

PMA30120 Certificate III in Process Plant Operations

Pathways into the qualification

There are no entry requirements into this qualification.

Credit may be granted towards this qualification by those who have been awarded the PMA20116 Certificate II in Process Plant Operations.

Pathways from the qualification

Further training pathways from this qualification include the PMA40116 Certificate IV in Process Plant Technology.

PMA40116 Certificate IV in Process Plant Technology

Pathways into the qualification

There are no entry requirements into this qualification.

Credit may be granted towards this qualification by those who have been awarded the PMA30120 Certificate III in Process Plant Operations.

Pathways from the qualification

Further training pathways from this qualification include the PMA50116 Diploma of Process Plant Technology.

PMA50116 Diploma of Process Plant Technology

Pathways into the qualification

There are no entry requirements into this qualification.

Credit may be granted towards this qualification by those who have been awarded the PMA40116 Certificate IV in Process Plant Technology, depending on the electives chosen.

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Pathways from the qualification

Further training pathways from this qualification include the PMA60116 Advanced Diploma of Process Plant Technology.

PMA60116 Advanced Diploma of Process Plant Technology

Pathways into the qualification

There are no entry requirements into this qualification.

Credit may be granted towards this qualification by those who have been awarded the PMA50116 Diploma of Process Plant Technology.

Pathways from the qualification

Further training pathways from this qualification include entry into a degree program.

Qualifications, occupational outcomes and the AQF

The Australian Qualifications Framework (AQF) is the national policy for regulated qualifications in Australian education and training. The AQF levels define the relative complexity and depth of achievement and the autonomy required of graduates to demonstrate that achievement. RTOs must meet the requirements of the AQF (<https://www.aqf.edu.au/>). They must also ensure that candidates are enrolled in appropriate qualifications. This section provides information for each qualification about the occupational outcomes; gives examples of the work at that AQF level and gives the AQF qualification type learning outcomes descriptor.

The AQF qualification type learning outcomes descriptor includes the volume of learning. Definitions of 'volume of learning' and 'amount of training' are given below.

The AQF provides the **volume of learning** allocated to a qualification. This includes all teaching, learning and assessment activities that are required to be undertaken by the typical student to achieve the learning outcomes. These activities may include guided learning (classes, lectures, tutorials, online or self-paced study), individual study, research, learning activities in the workplace, and assessment activities.

The **amount of training** provided by an RTO is part of the overall volume of learning and relates primarily to formal activities. These formal activities can include classes, lectures, tutorials, online or self-paced study, as well as workplace learning. The amount of training essentially comprises the formal learning activities an RTO provides to a learner.

The RTO is required to comply with the AQF in applying the volume of learning to training programs and must therefore develop and implement strategies for training and assessment that are consistent with the AQF.

RTOs developing their training and assessment strategy must take into account the need to allow candidates to reflect on and absorb the knowledge, to practise the skills in different contexts, and to learn to apply the skills and knowledge in the varied environments that the 'real world' offers, before being assessed.

The following sections give the description of each qualification, and the relevant AQF descriptor, including the volume of learning that is required.

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PMA20116 Certificate II in Process Plant Operations

The PMA20116 Certificate II in Process Plant Operations offers entry-level training for plant operators who would normally work under direct supervision. It applies to those working in the field/'outside' operating plants comprised of basic unit processes.

This qualification covers the skills and knowledge required to perform the range of functions and duties required of operators.

Operators perform a range of monitoring and operating duties as part of a shift team and would normally be responding to, and under the direction of, a control-room/panel operator. They apply a restricted range of skills and operational knowledge to perform these tasks and do not generally operate a control panel, other than a local panel. They:

- follow set procedures
- undertake routine operations on plant and equipment
- monitor, operate and contribute to start-ups and shutdowns of plant and equipment
- make visual and aural inspection of plant, equipment and processes.

Examples of the work of operators are given below:

- complete daily rounds and logs
- make observations about the condition of the plant
- identify anything requiring attention and either take remedial action or report it to the panel operator/senior operator
- make investigations at the request of the panel operator/senior operator
- changeover operating units in liaison with the panel operator
- prepare the plant to be taken out of service/brought back into service
- undertake other activities to procedure as requested.

AQF qualification type learning outcomes descriptor

Purpose

The Certificate II qualifies individuals to undertake mainly routine work and provides a pathway to further learning.

Knowledge

Graduates of a Certificate II will have basic factual, technical and procedural knowledge in a defined area of work and learning.

Skills

Graduates of a Certificate II will have:

- cognitive skills to access, record and act on a defined range of information from a range of sources
- cognitive and communication skills to apply and communicate known solutions to a limited range of predictable problems

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- technical skills to use a limited range of equipment to complete tasks involving known routines and procedures with a limited range of options.

Application

Graduates of a Certificate II will demonstrate the application of knowledge and skills with some accountability for the quality of own outcomes within narrow parameters. Work involves limited autonomy and judgement in the completion of own defined and routine tasks in known and stable contexts and in collaboration with others in a team environment.

Volume of learning

The volume of learning of a Certificate II is typically 0.5–1 year. This equates to 600–1200 hours and includes time spent developing competency in the workplace.

PMA30120 Certificate III in Process Plant Operations

The PMA30120 Certificate III in Process Plant Operations offers technical training for plant operators/operations technicians who use production equipment to directly produce product. Certificate III is generally the base level of competency required by industry.

This qualification offers seven, optional specialisations.

Operators/technicians would undertake more advanced operations, typically of integrated plant units in accordance with the operating procedures. They apply well-developed technical skills and basic scientific knowledge to solve a range of foreseen and unforeseen problems. The majority of their work involves routine monitoring and operation, but also proactive attention to deviations from normal operating parameters. They:

- follow set procedures to operate a complex plant
- use a distributed control system (DCS)-type control panel to operate plant and equipment
- monitor, operate and take a lead for startups and shutdowns of plant and equipment
- make visual, aural and virtual inspections of plant, equipment and processes.

Examples of the work of plant operators/technicians are given below:

- complete observations and logs
- monitor trends for key process variables
- make observations about the condition of the plant and process
- identify anything requiring attention and either take remedial action or report it to the appropriate person
- changeover operating units in liaison with the field/'outside' operator
- prepare the plant to be taken out of /brought back into service
- undertake other activities according to procedure as requested.

AQF qualification type learning outcomes descriptor

Purpose

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The Certificate III qualifies individuals who apply a broad range of knowledge and skills in varied contexts to undertake skilled work and provides a pathway for further learning.

Knowledge

Graduates of a Certificate III will have factual, technical, procedural and theoretical knowledge in an area of work and learning.

Skills

Graduates of a Certificate III will have:

- cognitive, technical and communication skills to interpret and act on available information
- cognitive and communication skills to apply and communicate known solutions to a variety of predictable problems and to deal with unforeseen contingencies using known solutions
- technical and communication skills to provide technical information to a variety of specialist and non-specialist audiences
- technical skills to undertake routine and some non-routine tasks in a range of skilled operations.

Application

Graduates of a Certificate III will demonstrate the application of knowledge and skills with discretion and judgement in the selection of equipment, services or contingency measures, and skills to adapt and transfer skills and knowledge within known routines, methods, procedures and time constraints.

Work is in the context of taking responsibility for own outputs in work and learning including participation in teams and taking limited responsibility for the output of others within established parameters.

Volume of learning

The volume of learning of a Certificate III is typically 1–2 years which equates to 1200–2400 hours and includes time spent developing competency in the workplace.

PMA40116 Certificate IV in Process Plant Technology

The PMA40116 Certificate IV in Process Plant Technology offers technical training for plant technicians operating more complex control panels and/or plant.

Plant technicians undertake a wide range of activities that require the application of a broad range of technical skills and some scientific knowledge. They will also be responsible for the operation of complex and/or integrated plant processes and will typically be the most senior technical person on shift, and so will need to be able to respond appropriately to suboptimal or other abnormal situations and take the technical lead on the response.

They:

- follow procedures and protocols to operate a more complex plant
- use a DCS-type control panel for complex operation of plant and equipment
- monitor, operate and take a lead for startups and shutdowns of plant and equipment, and non-routine problem-solving

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- make visual, aural and virtual inspections of plant, equipment and processes
- define and solve problems where the information available is less obvious, but not contradictory, and can be determined by direct reasoning
- will often be the most senior person on shift
- generally work in a team and may have responsibility for their own work outputs.

Examples of the work of plant technicians are given below:

- operate a complex plant using a DCS type system
- take a technical lead for solving non-routine problems
- respond to issues raised by other operators
- proactively 'tune' the plant to achieve a better process outcome.

AQF qualification type learning outcomes descriptor

Purpose

The Certificate IV qualifies individuals who apply a broad range of specialised knowledge and skills in varied contexts to undertake skilled work and provides a pathway for further learning.

Knowledge

Graduates of a Certificate IV will have broad factual, technical and theoretical knowledge in a specialised field of work and learning.

Skills

Graduates of a Certificate IV will have:

- cognitive skills to identify, analyse, compare and act on information from a range of sources
- cognitive, technical and communication skills to apply and communicate technical solutions of a non-routine or contingency nature to a defined range of predictable and unpredictable problems
- specialist technical skills to complete routine and non-routine tasks and functions
- communication skills to guide activities and provide technical advice in the area of work and learning.

Application

Graduates of a Certificate IV will demonstrate the application of knowledge and skills to specialised tasks or functions in known or changing contexts with responsibility for own functions and outputs, and may have limited responsibility for organisation, quantity and quality of the output of others within limited parameters.

Volume of learning

The volume of learning of a Certificate IV is typically 0.5–2 years. This equates to 600–2400 hours and includes time spent developing competency in the workplace.

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PMA50116 Diploma of Process Plant Technology

The PMA50116 Diploma of Process Plant Technology offers paraprofessional technical training in a process plant for technicians.

Technicians at this level bring a breadth and depth of operational competence to technical projects. In addition, the Diploma makes available various units requiring the application of mathematics which may be beneficial for those seeking articulation through to a Chemical Engineering (or other relevant) degree.

They:

- provide operational expertise to a technical project team
- undertake process and plant investigations
- undertake planning and improvement projects
- provide expertise and leadership during abnormal situations.

Examples of the work of technicians are given below:

- An engineering project team has been established to make changes to the plant and the technician is there to provide in-depth knowledge of the existing plant and how these changes will impact on it.
- A plant shutdown/turnaround is scheduled to occur and the technician undertakes detailed planning associated with this.
- A technician is engaged to conduct a process-improvement project, either individually or in liaison with others (operators, engineers etc.).
- The process is out of control/threatening to become out of control and is beyond the normal responses and so the technician will take the lead in containing this excursion and bringing it back into normal control.

AQF qualification type learning outcomes descriptor

Purpose

The Diploma qualifies individuals who apply integrated technical and theoretical concepts in a broad range of contexts to undertake advanced skilled or paraprofessional work and provides a pathway for further learning.

Knowledge

Graduates of a Diploma will have technical and theoretical knowledge and concepts, with depth in some areas within a field of work and learning.

Skills

Graduates of a Diploma will have:

- cognitive and communication skills to identify, analyse, synthesise and act on information from a range of sources

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- cognitive, technical and communication skills to analyse, plan, design and evaluate approaches to unpredictable problems and/or management requirements
- specialist technical and creative skills to express ideas and perspectives
- communication skills to transfer knowledge and specialised skills to others and demonstrate understanding of knowledge.

Application

Graduates of a Diploma will demonstrate the application of knowledge with depth in some areas of specialisation, in known or changing contexts, and skills to transfer and apply theoretical concepts and/or technical and/or creative skills in a range of situations, with personal responsibility and autonomy in performing complex technical operations and for quantity and quality. Work involves initiative and judgement to organise own work and others', and to plan, coordinate and evaluate the work of teams within broad but generally well-defined parameters.

Volume of learning

The volume of learning for a Diploma is typically 1–2 years which equates to 1200–2400 hours and includes time spent developing/using the competency in the workplace.

PMA60116 Advanced Diploma of Process Plant Technology

The PMA60116 Advanced Diploma of Process Plant Technology offers higher-level paraprofessional technical training in a process plant for senior technicians.

Senior technicians at this level bring a breadth and depth of operational competence to undertake technical projects. In addition, the Advanced Diploma makes available various units requiring the application of mathematics, which may be beneficial for those seeking articulation through to a Chemical Engineering (or other relevant) degree. In addition to the items in the Diploma, they undertake:

- plant modifications
- projects to removed bottlenecks.

The work of Senior Technicians involves balancing technical and operational demands. They may also undertake a range of complex technical tasks, for example:

- The demand for the product of a plant exceeds its capacity to supply, so the technician will undertake a project to identify the process causing the bottleneck and then make changes to increase the capacity at the point of the bottleneck.
- A problem exists with the plant or process, or a better way of undertaking that process has become available, so the technician will undertake a project to modify the plant, thereby improving it.

AQF qualification type learning outcomes descriptor

Purpose

The Advanced Diploma qualifies individuals who apply specialised knowledge in a range of contexts to undertake advanced skilled or paraprofessional work and provides a pathway for further learning.

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Knowledge

Graduates of an Advanced Diploma will have specialised and integrated technical and theoretical knowledge with depth within one or more fields of work and learning.

Skills

Graduates of an Advanced Diploma will have:

- cognitive and communication skills to identify, analyse, synthesise and act on information from a range of sources
- cognitive and communication skills to transfer knowledge and skills to others and to demonstrate understanding of specialised knowledge with depth in some areas
- cognitive and communication skills to formulate responses to complex problems
- wide-ranging specialised technical, creative or conceptual skills to express ideas and perspectives.

Application

Graduates of an Advanced Diploma will demonstrate the application of knowledge and skills with depth in areas of specialisation, in contexts subject to change, using initiative and judgement in planning, design, technical or management functions with some direction.

Work requires adapting a range of fundamental principles and complex techniques to known and unknown situations across a broad range of technical or management functions, with accountability for personal outputs and personal and team outcomes within broad parameters.

Volume of learning

The volume of learning of an Advanced Diploma is typically 1.5–2 years which equates to 1800–2400 hours and includes time spent developing/using the competency in the workplace.

Choosing electives

The electives listed within the PMA Chemical, Hydrocarbons and Refining Training Package provide for skills development in all industry sectors identified by industry representatives during consultations. All qualifications are able to be customised since particular combinations of elective units can be selected to suit individual candidate needs and the industry sector.

This section provides information about:

- qualifications with specialisations
- the design philosophy for units of competency
- selecting appropriate elective units of competency
- importing elective units
- contextualising units of competency.

Qualifications with specialisations

All PMA qualifications offer elective choices, but the only qualification with optional, bracketed specialisations is the Certificate III in Process Plant Operations. The qualification outlines packaging

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rules for seven optional specialisations in Offshore Oil Upstream, Gas/LNG Upstream, Gas/LNG Downstream, Utilities, CSG Plant, CSG Well and CSG Pipelines. Following the 2012 Standards for Training Packages, bracketed specialisations are not an option for any other qualification.

The electives in any qualification will be chosen, based on industry engagement, to meet the needs of that industry sector and to be relevant to the work outcome.

Design philosophy for units of competency

PMA units have been broadly grouped in the following categories:

- PMAOPS### – operations (technical units)
- PMASUP### – support
- PMAOMIR### – incident readiness and response
- PMAWHS### – work health safety
- PMASMELT### – smelting operations.

The technical units of competency (PMAOPS) are based on an industry standard: unit operations. A total process may be designed as a collection of relevant and connected unit operations or process systems. This will include techniques and principles that will be common across PMAOPS units.

Not all unit operations are of the same level of complexity. Units aligned as technical units for the Certificate II require competence in the operation of an individual plant item/unit operation. Units aligned as technical units for the Certificate III require competence in the operation and troubleshooting of a plant unit process system which includes the operation of more than one plant item/unit, which together make up the unit as a whole. Similarly, with the Certificate IV, technical units are applied to an entire plant area which may contain several plant units and/or many plant items. The Diploma and Advanced Diploma are intended as paraprofessional qualifications and so are not directly based on the competence to operate a unit operation.

The significance of this is discussed below in the section ‘Selecting appropriate elective units of competency’.

Selecting appropriate elective units of competency

Technical units

To select the appropriate technical units of competency, the process needs to be examined and the unit operations determined. From these unit operations, the aligned unit of competency should be selected. The units of competency will then dictate the appropriate qualification, which should be a result of the technical units selected and so directly align with the process.

Some special cases

While undertaking the process analysis described above will generally deliver a unique list of relevant technical units, there are a few instances where there may still be alternative appropriate technical units. It is important therefore to distinguish them properly. Guidelines for doing this are given below. As always, they should be distinguished based on the level of complexity of operation, not necessarily the level of technical complexity of the plant item/unit/process system.

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Compressors

There are two compressor units (and a potential third – see MSMOPS100 below):

- PMAOPS234 Monitor and operate low pressure compressors
- PMAOPS314 Operate and troubleshoot compressor systems.

While the unit titles may suggest that the difference is purely based on the pressure generated by the compressor, this is not the case and no pressure guidance is given in the units.

In keeping with the design philosophy, the operation required by PMAOPS314 is of a high-pressure compressor system, which requires the concurrent operation of interstage coolers (PMAOPS205 Operate heat exchangers), and a sophisticated lubricating system, which may have its own cooling system and perhaps a heating system for startup. Such a compressor will have an involved startup procedure (which may be controlled by the DCS). These compressors are multistage and may be centrifugal, reciprocating or other.

Compressors covered by PMAOPS234 do not have these features, and by default only produce a lower pressure (hence the title). These compressors suit the description of a plant item, whereas PMAOPS314 is clearly a plant unit/system (as per the title).

Reactors

There are three units targeting the operation of equipment intended to control a chemical reaction (chemical reactions may also occur incidentally in other plant systems such as scrubbers and ion exchange, which have their own units). These units are:

- PMAOPS220 Monitor chemical reactions in the process
- PMAOPS311 Operate and troubleshoot reactors and reaction equipment
- PMAOPS313 Operate and troubleshoot furnaces to induce reaction.

PMAOPS313 is the easiest to distinguish as it applies to cracking furnaces (thermal or catalytic) and similar plant units operating at very high temperatures. By their nature, these units are inevitably complex.

If, however, there are reactions occurring at ambient or elevated temperatures (but not in a furnace), then the more appropriate unit to use is either PMAOPS220 or PMAOPS311. Again, the distinction is based on complexity.

If there is a simple kettle or continuous plug flow reactor, where all reactants are added at the beginning and all products removed at the end, then PMAOPS220 is the relevant unit.

If, however, the reactor (batch or continuous) requires the concurrent operation of a range of other unit operations, then PMAOPS311 is the relevant unit. Examples include the use of reflux, product separation and return, continuous stirred tank reactors, heterogeneous phase reactors where the phases are either separated or need to be maintained in contact, and so on. Reactions may or may not be catalytic.

Process control

There are six units in the PMA training package that deal with process control:

- PMAOPS101 Read dials and indicators

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- PMAOPS216 Operate local control system
- PMAOPS315 Operate and troubleshoot process control systems
- PMAOMIR306 Operate control panel during an emergency
- PMAOPS405 Operate complex control systems
- PMAOPS505 Control the process in abnormal situations.

PMAOPS101 Read dials and indicators Control decisions are made based on the readings and this unit is integral to the field/‘outside’ operator’s job. It would not normally be trained or assessed as a standalone unit unless there were specific circumstances.

PMAOPS216 Operate local control system covers ‘local’ control panels (a panel located in the field, operated by the field operator). It may, however, be remote from the plant it controls and is distinguished from a control-panel unit in that it is restricted to the operation of one unit operation (or part of a unit operation) only and is commonly a programmable logic controller (PLC). It typically also transmits information to, and receives control information from, the DCS. This unit may be applied to any simple control system.

Emergency/abnormal process control is covered by two units – **PMAOMIR306 Operate control panel during an emergency** and **PMAOPS505 Control the process during abnormal situations**. These are different from the other process control units because they only apply during incidents or emergencies. They would therefore only be selected in addition to other process control units (or where competence had already been achieved in the routine control units). Their assessment must be by simulation of such events and may include various scenarios and perhaps war-gaming. Where a process simulator is available that allows for the creation of such events, this could provide valuable evidence of competency. The distinguishing feature between these two units is that PMAOMIR306 is intended to apply to the panel operator who happens to be on shift when the event occurs.

PMAOPS505 may apply to the panel operator, but more likely will apply to the senior technical person on shift. They may take over the ‘hands on’ operation of the DCS, but more likely will be present in the control room giving direction and advice to the panel operator/s and other operators for the duration of the abnormal situation (which may or may not be an emergency). In most organisations there will be senior operators with a wealth of experience in past incidents to reference that would make valuable assessment scenarios.

Perhaps the most problematic units to distinguish between are PMAOPS306 and PMAOPS405. There are differences within the units, but these could lead to a decision based simply on the complexity of the control system, rather than the complexity of operation, which is consistent with the PMA design philosophy.

Therefore, PMAOPS405 should be used when the complexity of the operation, and the depth of understanding required, is greater than is required for the routine operation of a DCS.

This perhaps best shows up in the breadth of control exercised by the panel operator, i.e. the number and complexity of plant operations controlled, rather than just the technical complexity of the DCS/APC, and so consideration should be given to factors such as:

- controlling entire plant areas, multiple streams
- optimising production using the DCS

- resolving routine and non-routine problems
- identifying early warning signs and initiating appropriate action.

MSMOPS100/MSMOPS200/PMAOPS306

The diversity within the PMA sector is such that it is not possible to have a technical unit of competency to cover every possible unit operation. To provide for those situations where unique or unusual plant is being used, three technical units of competency have been provided. They are intended to be used when there is not another appropriate OPS unit and must be contextualised to the specific situation:

- **MSMOPS100** is intended for when the item of plant is operated with limited input from the operator and limited understanding of the operation of the equipment is required. The equipment itself may be technically complex and sophisticated, but the operation is simple – turn on/off and monitor. Examples might include backup/hire air compressors, air conditioning in a building, backup/hire power generators and so on. It would not be usual to include this in an operator's qualifications, as there is little benefit to be gained. However, there may be circumstances where it will be relevant.
- **MSMOPS200** is intended for those situations where there is a single unit operation being used which is not covered by the other OPS200 units.
- **PMAOPS306** should be considered where the operation is more complex. Here, comparison of the unit operation with the examples of compressors (see above) or distillation, should provide a guide. For example, for distillation (PMAOPS310), it is clear that a distillation system is commonly comprised of at least:
 - the distillation column itself (the distillation unit operation)
 - condensers and reboilers (heat exchange unit operation PMAOPS205)
 - pumps, pipes and valves (fluid flow unit operation PMAOPS201).

These all need to be operated concurrently in order to operate the distillation system as a whole.

Other units

The operator's/technician's job is not purely technical, although without technical competence the person cannot be regarded as an operator. The 'other' units of competency represent components of this broader role. The particular job roles of the operators/technicians should be examined and the relevant *other* electives selected.

Importing elective units

The packaging rules of all qualifications enable units of competency to be imported from any Training Package that is directly relevant to the candidate's current or intended work environment. In providing this flexibility it is incumbent on RTOs to ensure that the integrity of qualifications in the Training Package is maintained. It is a requirement that RTOs can provide evidence of engaging with industry to select imported electives. The following guidelines for importing units apply.

Imported units must relate to core functions or roles in the candidate's current or intended work environment (for example, laboratory operations, process manufacturing operations, front line management, workplace training and assessment).

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Imported units must come from endorsed Training Packages or accredited courses. Any prerequisites specified in the original unit and any specific assessment requirements in the host training package must be observed.

Contextualising units of competency

Units of competency may, and in some cases should, be contextualised to the subsector and type of work environment involved. Contextualisation is allowed and actively encouraged, it must be relevant to the industry sector and the organisation. A contextualised unit should replace:

- general directions with organisational specific needs
- generic equipment/process names with organisational specific names
- general processes/specifications with organisational specific needs.

A contextualised unit should not reduce the health, safety or environmental requirements.

Health, safety and environment

All operations must comply with work health and safety (WHS) and environmental management requirements, which may be imposed through state/territory or federal legislation – these requirements must not be compromised at any time.

All operations assume the potentially hazardous nature of the industry and require standard controls to be applied.

Applicable legislation, regulations, standards and codes of practice may include the following:

- WHS legislation, codes of practice and guidance material
- major hazard facility (MHF) codes and regulations
 - *Control of Major Hazard Facilities National Standard* [NOHSC:1014 (2002)]
 - *National Code of Practice* [NOHSC:2016(1996)]
- offshore operation codes and regulations
- environmental regulations and guidelines
- other relevant government legislation, regulations and codes
- Australian, ISO and other standards
 - *Australian Standard AS 2885.3—2012 Pipelines—Gas and liquid petroleum Part 3: Operation and maintenance*
- other relevant codes and standards
- licence and certification requirements.

The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.

Individual units of competency give details on the relevant WHS requirements.

Risk management and industry requirements for refresher training and/or reassessment

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Certain units of competency in this training package are associated with elevated levels of risk, which is either inherent in the performance of the competency, or the competency is critical in managing the risk of an activity. Further to this, some of these units are not routinely practiced and so, to maintain competency, regular retraining may be required. Refresher training will be specified in the relevant Australian Standard or by industry. Units that may require refresher training include:

- MSMPER205 Enter confined space
- MSMWHS210 Undertake first response to non-fire incidents
- MSMWHS212 Undertake first response to fire incidents
- MSMWHS216 Operate breathing apparatus
- MSMWHS217 Gas test atmospheres.

Access and equity

A learner's access to the training and assessment process should not be adversely affected by restrictions placed on the location or context of assessment beyond the requirements specified in this training package. Training and assessment must be bias-free.

Reasonable adjustments

Under the Disability Standards for Education 2005, training providers must make reasonable adjustments for people with disability to the maximum extent that those adjustments do not cause that provider unjustifiable hardship. While 'reasonable adjustment' and 'unjustifiable hardship' are different concepts and involve different considerations, they both seek to strike a balance between the interests of education providers and the interests of candidates with and without disability. The Disability Standards and guidelines for their implementation can be downloaded at <https://www.legislation.gov.au/Details/F2005L00767>.

An adjustment is any measure or action that a candidate requires because of their disability, and which has the effect of assisting them to access and participate in education and training on the same basis as those without a disability. An adjustment is reasonable if it achieves this purpose while taking into account factors such as the nature of the candidate's disability, their views, the potential effect of the adjustment on the candidate and others who might be affected, and the costs and benefits of making the adjustment.

A training provider is also entitled to maintain the academic requirements of a course or program and to consider the requirements or components that are inherent or essential to its nature when assessing whether an adjustment is reasonable. There may be more than one adjustment that is reasonable in a given set of circumstances; education providers are required to make adjustments that are reasonable and that do not cause them unjustifiable hardship.

Adjustments should not diminish the rigour of the unit of competency being assessed.

Foundation skills

Foundation skills are those core or essential skills we need to engage successfully in work and life. The term 'Foundation Skills' is currently used to include the core skills defined in the Australian Core Skills Framework (ACSF) as well as the employability skills identified as critical for effective

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performance in the workplace. The core skills of the ACSF include reading, writing, oral communication, numeracy and learning.

Foundation Skills are deemed essential to successful learning and continuing employment. In the PMA units of competency advice is provided regarding relevant foundation skills in the Foundation Skills Field of the units. Other foundation skills are explicit in the performance criteria. A mapping of each PMA unit of competency against the ACSF is given in **Appendix 2**.

It is important to note that the ACSF mapping has not been validated and is available as a guide only. The mapping provides the ACSF levels required of a competent learner. It may be used to assist with judgements about potential enrolments. An RTO must undertake its own assessment, and validate outcomes, to ensure consistent judgement of ACSF levels that should be achieved by the learner at the end of a vocational training program.

Employability skills

Employability Skills are best identified holistically at the qualification level. There are eight Employability Skills:

- communication
- teamwork
- problem solving
- initiative and enterprise
- planning and organising
- self-management
- learning
- technology.

An Employability Skills Summary for each PMA qualification is provided in **Appendix 3**. Summaries are designed to assist trainers and assessors to identify and include important industry application of Employability Skills in training and assessment strategies.

- Employability Skills Summaries provide examples of how each skill is applicable to the occupational outcomes covered by the qualification.
- Employability Skills Summaries contain general information about industry context which is further explained as measurable outcomes of performance in the units of competency in each qualification.
- The detail in each Employability Skills Summary will vary depending on the range of occupational outcomes covered by the qualification in question.
- Employability Skills Summaries are not exhaustive lists of qualification requirements or checklists of performance (which are separate assessment tools that should be designed by trainers and assessors after analysis at the unit level).
- Employability Skills Summaries contain information that may also assist in building candidates' understanding of industry and workplace expectations.

Delivering the training

Skilled trainers and assessors

Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.

Generally, the RTO's training and assessment is delivered only by persons who have:

- a) vocational competencies at least to the level being delivered and assessed
- b) current industry skills directly relevant to the training and assessment being provided, and
- c) current knowledge and skills in vocational training and learning that informs their training and assessment.

Industry experts may also be involved in the assessment judgement, working alongside the trainer and/or assessor to conduct the assessment.

Technical competence may 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 may 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.

Mode of delivery

Training and assessment in PMA may be delivered face-to-face, online, through workplace training, using distance learning or a mixture of different modes/blended delivery. Industry has determined that a learner should practically apply skills either on the job and/or in a simulated environment with appropriate resources and equipment. It is essential the Principles of Assessment, the Rules of Evidence and the unit of competency and assessment requirements are met.

Resource and equipment requirements

Details of the assessment requirements of each unit are given in the unit. Technical units will generally require access to operational, industrial type plant and equipment. For example,

equipment that applies to *PMAOPS351 Operate and troubleshoot turret swivel systems* may include but is not limited to:

- mooring system
- mechanical handling systems
- subsea hydraulic systems
- turret lube system
- drains, flare and utility systems associated with turret
- firefighting systems
- pigging interface (if applicable)
- leak recuperation system.

This creates a bias towards using workplace evidence and the use of simulation. WHS and incident response units will generally need to be assessed off the job and require realistic simulation.

Assessing candidates

Assessment methods must ensure that only properly skilled candidates are determined as competent.

Judgement of competence must be based on holistic assessment of all of the evidence. Assessment must meet the Principles of Assessment and the Rules of Evidence.

Foundation skills are integral to competent performance of the unit and should not be assessed separately.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed. Reasonable adjustments can be made to suit individual needs, but the standard for assessment outlined in the assessment requirements must not be altered.

Performance evidence

Assessment methods must confirm consistency of performance over time, rather than during a single assessment event. Assessors must ensure there is variance in assessment contexts when assessments are undertaken as directed in the Performance Evidence: *'at least 2 times, each in a separate work context'*.

This will apply to both workplace and non-workplace assessments, whether in real or simulated conditions.

Examples of variance include but are not limited to the following variables:

- weather conditions
- environmental factors
- time of day assessments are undertaken
- underpinning causal event
- physical location

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- plant/equipment used.

Knowledge evidence

Evidence of knowledge may be collected concurrently with performance evidence or through an independent process such as workbooks, written assessments or interviews (provided a record is kept in each case).

Most technical units will require a candidate to have knowledge of all the items of a particular system or unit. Industry has recommended it is a requirement that the assessment process involves drawing basic process schemes as they relate to the system.

Operational documentation and schematics are managed through a continuous improvement cycle that ensures any modification or change in plant is captured and included in future documentation. This process involves marking up the changes on the relevant documentation and progressing the change through a managed process. This process is often referred to as the Red Line mark-up process.

An understanding of the Red Line mark-up process in the document control system will be required for some units.

Assessment conditions

Access must be provided to equipment, workplace documentation, procedures and specifications associated with the unit of competency. Details are specified in the Assessment Conditions for each unit.

Designing assessment for the PMA industries

The design of assessment needs to ensure that the dimensions of competency are covered:

- task skills (performance of individual tasks)
- task management skills (managing a number of different tasks within the job)
- contingency management skills (responding to abnormal situation such as problems, breakdowns and changes in routine)
- job/role environment skills (dealing with the responsibilities and expectations of the workplace).

Evidence-gathering methods must be gender and culturally inclusive and take into account the language, literacy and numeracy skills of the candidate and requirements of the unit and the workplace.

Assessors may consider:

- incorporating a range of assessment techniques
- integrating the assessment of units related to the performance of 'whole of work' tasks, roles or functions
- using a holistic approach which combines knowledge, understanding, problem-solving, technical skills and applications to new situations into the assessment process
- assessing in the workplace (wherever possible), using familiar skills and materials

- eliminating any unnecessary reading or written assessment (if these skills are not required by the unit to do the job, they should not be part of the assessment)
- ensuring understanding of questions by rephrasing to clarify and using the language and terms of the job and the workplace
- encouraging the candidate to ask questions to clarify instructions
- providing clarification of purpose and process of assessment
- considering cultural and gender issues when setting up the assessment.

Useful information about designing assessment tools can be accessed in the *Guide to developing assessment tools*, developed by Australian Skills Quality Authority (ASQA), 2015. It is available for download at:

https://www.asqa.gov.au/sites/default/files/Guide_to_developing_assessment_tools.pdf.

This guide was developed with consideration to previous work developed by the National Quality Council (NQC) and the well-used resource *Designing assessment tools for quality outcomes in VET*, 4th Edition Western Australia, Department of Training and Workforce Development, 2013.

Conducting assessments

Where assessment is occurring in the workplace:

- Take into account that the person being assessed may have had little experience of structured training and assessment. Carefully explain the process of making judgements against the standards and make the candidate feel as relaxed as possible consistent with the needs of the unit of competency.
- Consult on the assessment process with the parties involved.
- The assessment should take place over a reasonable length of time so that the candidate has the opportunity to demonstrate work responsibility and contingency management. (Third party reports of workplace performance, if available, are helpful for this.)
- Consider the other staff in the workplace likely to be affected by the process. All staff directly or indirectly involved in the process should be briefed on the factors which will impact on them, such as duration or changes in work routine.
- Ensure that assessment is as compatible as possible with the normal pattern of work and causes minimal disruption. If the process involves candidates being away from their work area for a period of time, then arrangements should be made with their immediate supervisor to cover their duties for that period of time.

Where assessment is occurring out of the workplace, it is important to ensure that:

- the assessment takes place in a situation as close as possible to workplace reality
- all aspects of competency are assessed
- the assessment takes place over a reasonable length of time so that the candidate has the opportunity to demonstrate work responsibility and contingency management. Third party reports of workplace performance, if available, are helpful for this
- documents used in assessment closely reflect workplace reality.

Suggestions regarding assessing units together

While units of competence are standalone specifications of competency outcomes, in the workplace they are frequently practiced in an integrated manner. It therefore makes sense, both in terms of industrial reality and assessment efficiency, to assess units together. In the case of technical units, the clustering of units to be assessed together will be largely driven by the process and work organisation. The validity of assessment for some units is greatly increased by assessing them with other units.

Core units

There are five core units:

- MSMENV272 Participate in environmentally sustainable work practices
- MSMSUP100 Apply workplace context to own job
- MSMSUP102 Communicate in the workplace
- MSMWHS110 Follow emergency response procedures
- MSMWHS200 Work safely

It is expected that the learning component of these should be covered during induction as will the assessment for:

- MSMENV272 Participate in environmentally sustainable work practices
- MSMSUP100 Apply workplace context to own job
- MSMWHS200 Work safely.

It is expected that MSMWHS110 will also require participation in an emergency drill to complete the evidence required.

MSMSUP102 would generally be best assessed by folding its assessment into a cluster of technical units, which would allow for the assessment of communication in a practical and relevant environment. Should there be language and literacy issues, it may need to be trained and assessed independently.

Technical units

As mentioned above, the clustering of technical units to be assessed together should be largely driven by the process and work organisation.

Other units

Workplace practice will also indicate appropriate clustering of other units. Some of these will be captured by the Skill Sets in this training package; others will reflect more local arrangements.

Links

General

Australian Qualifications Framework: Second edition, January 2013: <https://www.aqf.edu.au/aqf-second-edition-january-2013>

TGA website, training packages: <https://training.gov.au/>

Service Skills Organisations: <https://www.aisc.net.au/content/skills-service-organisations>

Australian Skills Quality Authority (ASQA): <https://www.asqa.gov.au/>

Victorian Registration and Qualifications Authority: <https://www.vrqa.vic.gov.au/>

Training Accreditation Council, WA: <https://www.tac.wa.gov.au/>

Australian Apprenticeships: <https://www.australianapprenticeships.gov.au/>

State and Territory Government Training Departments

Australian Capital Territory: <https://www.skills.act.gov.au/>

New South Wales: <https://www.training.nsw.gov.au/>

Northern Territory: <https://business.nt.gov.au/>

Queensland: <https://desbt.qld.gov.au/training>

South Australia: <https://innovationandskills.sa.gov.au/>

Tasmania: <https://www.skills.tas.gov.au/home>

Victoria: <https://www.education.vic.gov.au/>

Western Australia: <https://www.dtwd.wa.gov.au/training>

Appendix 1: Summary mapping

PMA Release 2.3 qualifications mapped to PMA Release 2.2

E = equivalent N = Not equivalent

Code and Title of Current Release 2.3		Code and Title of Previous Release 2.2			
Code	Title	Code	Title	Comment	E/N
PMA20116	Certificate II in Process Plant Operations	PMA20116	Certificate II in Process Plant Operations	Reinstatement of 10 PMASMELT units	E
PMA30120	Certificate III in Process Plant Operations	PMA30120	Certificate III in Process Plant Operations	Reinstatement of 10 PMASMELT units	E
PMA40116	Certificate IV in Process Plant Technology	PMA40116	Certificate IV in Process Plant Technology	Reinstatement of 10 PMASMELT units	E

PMA Release 2.2 qualifications mapped to PMA Release 2.1

E = equivalent N = Not equivalent

Code and Title of Current Release 2.2		Code and Title of Previous Release 2.1			
Code	Title	Code	Title	Comment	E/N
PMA40116	Certificate IV in Process Plant Technology	PMA40116	Certificate IV in Process Plant Technology	Update to electives where first aid units are prerequisites	E

PMA Release 2.0 qualifications mapped to PMA Release 2.1 qualifications

E = equivalent N = Not equivalent

Code and Title of Current Release 2.1		Code and Title of Previous Release 2.0			
Code	Title	Code	Title	Comment	E/N
PMA20116	Certificate II in Process Plant Operations	PMA20116	Certificate II in Process Plant Operations	16 elective units deleted.	E
PMA30120	Certificate III in Process Plant Operations	PMA30120	Certificate III in Process Plant Operations	19 elective units deleted.	E
PMA40116	Certificate IV in Process Plant Technology	PMA40116	Certificate IV in Process Plant Technology	27 elective units deleted.	E
PMA50116	Diploma of Process Plant Technology	PMA50116	Diploma of Process Plant Technology	7 elective units deleted.	E
PMA60116	Advanced Diploma of Process Plant Technology	PMA60116	Advanced Diploma of Process Plant Technology	13 elective units deleted.	E

PMA Release 1.0 qualifications mapped to PMA Release 2.0 qualifications

PMA Qualifications Release 1.0	PMA Qualifications Release 2.0	Comments	E: Equivalent N: Not Equivalent
PMA20116 Certificate II in Process Plant Operations	PMA20116 Certificate II in Process Plant Operations	Elective units updated	E
PMA30116 Certificate III in Process Plant Operations	PMA30120 Certificate III in Process Plant Operations	Seven specialisations added, packaging rules amended and units in elective bank reduced	E
PMA40116 Certificate IV in Process Plant Technology	PMA40116 Certificate IV in Process Plant Technology	Elective units updated	E
PMA50116 Diploma of Process Plant Technology		no change	E
PMA60116 Advanced Diploma of Process Plant Technology		no change	E

PMA Release 2.3 units mapped to PMA Release 2.2 units

10 PMASMELT units reinstated in qualifications PMA20116 Certificate II in Process Plant Operations, PMA30120 Certificate III in Process Plant Operations and PMA40116 Certificate IV in Process Plant Technology.

PMA Release 2.3	PMA Release 2.2	Comments	E: Equivalent N: Not Equivalent
PMASMELT260 Form carbon anodes		Reinstated	E
PMASMELT261 Bake carbon anodes		Reinstated	E
PMASMELT262 Clean and strip anode rods		Reinstated	E
PMASMELT263 Spray carbon anodes		Reinstated	E
PMASMELT264 Start up reduction cells		Reinstated	E
PMASMELT266 Deliver molten metal		Reinstated	E
PMASMELT267 Cast ingots		Reinstated	E
PMASMELT268 Operate vertical direct casting process		Reinstated	E
PMASMELT269 Operate cell tending equipment		Reinstated	E
PMASMELT270 Supply product from reduction cells.		Reinstated	E

PMA Release 2.2 units mapped to PMA Release 2.1 units

HLTAID003 update to HLTAID011 as a prerequisite in PMAOMIR301 and PMAWHS320.

PMA Release 2.2	PMA Release 2.1	Comments	E: Equivalent
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			N: Not Equivalent
PMAOMIR301 Undertake initial rescue	PMAOMIR301 Undertake initial rescue	Pre-requisite unit updated from HLTAID003 to HLTAID011	E
PMAWHS32 Provide advanced first aid response	PMAWHS32 Provide advanced first aid response	Pre-requisite unit updated from HLTAID003 to HLTAID011	E

PMA Release 2.0 units mapped to PMA Release 2.1 units

PMA Release 2.0	PMA Release 2.1	Comments	E: Equivalent N: Not Equivalent
PMAOMIR449 Monitor legal compliance obligations during incidents		Deleted	
PMAOMIR523 Manage corporate media requirements in a crisis		Deleted	
PMAOMIR575 Coordinate welfare support activities in response to an incident		Deleted	
PMAOMIR622 Build partnerships to improve incident response capacity		Deleted	
PMAOPS211 Operate manufacturing extrusion systems		Deleted	
PMAOPS242 Moor ships for transfer of bulk processed particulates or fluids		Deleted	
PMAOPS263 Operate leaching equipment		Deleted	
PMAOPS265 Operate magnetic/electrical separation equipment		Deleted	
PMAOPS290 Operate a biotreater		Deleted	
PMAOPS360 Operate a metalliferous kiln/furnace		Deleted	
PMAOPS361 Operate a smelting furnace		Deleted	
PMAOPS362 Operate a blast furnace		Deleted	
PMAOPS364 Operate an electrochemical process		Deleted	
PMAOPS365 Operate pelletising equipment		Deleted	
PMAOPS366 Operate sintering equipment		Deleted	
PMAOPS550 Develop a colour formulation		Deleted	
PMAOPS560 Plan and design		Deleted	

tailings management facilities			
PMAOPS751 Apply physiochemical knowledge to select raw materials for surface coatings		Deleted	
PMAOPS752 Develop a decorative coating		Deleted	
PMAOPS753 Develop a non-decorative coating or ink		Deleted	
PMAOPS755 Provide surface coatings application advice		Deleted	
PMASMELT260 Form carbon anodes		Deleted	
PMASMELT261 Bake carbon anodes		Deleted	
PMASMELT262 Clean and strip anode rods		Deleted	
PMASMELT263 Spray carbon anodes		Deleted	
PMASMELT264 Start up reduction cells		Deleted	
PMASMELT266 Deliver molten metal		Deleted	
PMASMELT267 Cast ingots		Deleted	
PMASMELT268 Operate vertical direct casting process		Deleted	
PMASMELT269 Operate cell tending equipment		Deleted	
PMASMELT270 Supply product from reduction cells		Deleted	
PMASUP347 Undertake corrosion inspection on process plant		Deleted	
PMASUP432 Coordinate pipeline projects		Deleted	
PMASUP620 Manage environmental management system		Deleted	
PMAWHS221 Maintain first aid resources and records		Deleted	
PMAWHS321 Provide first aid response in remote and/or isolated area		Deleted	
PMAWHS420 Develop first aid procedures and manage resources		Deleted	

PMA Release 1.0 units mapped to PMA Release 2.0 units

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
PMAOMIR210	Control evacuation to		no change	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
	muster point			
PMAOMIR301	Undertake initial rescue		no change	E
PMAOMIR302	Respond to a helideck incident		no change	E
PMAOMIR305	Operate panel during an emergency	PMAOMIR306	Operate control panel during an emergency	E
PMAOMIR317	Facilitate search and rescue operations		no change	E
PMAOMIR320	Manage incident response information	PMAOMIR322	Manage incident response information	E
PMAOMIR321	Manage communication systems during an incident	PMAOMIR323	Manage communication systems during an incident	E
PMAOMIR346	Assess and secure an incident site		no change	E
PMAOMIR407	Audit incident preparedness and established response systems		no change	E
PMAOMIR418	Coordinate incident response		no change	E
PMAOMIR424	Develop and maintain community relationships		no change	E
PMAOMIR430	Conduct and assess incident exercises		no change	E
PMAOMIR444	Develop incident containment tactics		no change	E
PMAOMIR449	Monitor legal compliance obligations during incidents		no change	E
PMAOMIR512	Establish incident response preparedness and response systems		no change	E
PMAOMIR523	Manage corporate media requirements in a crisis		no change	E
PMAOMIR575	Coordinate welfare support activities in response to an incident		no change	E
PMAOMIR622	Build partnerships to improve incident response capacity		no change	E
PMAOMIR650	Manage a crisis		no change	E
PMAOPS101	Read dials and indicators		no change	E
PMAOPS105	Select and prepare materials		no change	E
PMAOPS201	Operate fluid flow equipment		no change	E
PMAOPS202	Operate fluid mixing equipment		no change	E
PMAOPS204	Select and use utilities and services		no change	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
PMAOPS205	Operate heat exchangers		no change	E
PMAOPS208	Operate chemical separation equipment		no change	E
PMAOPS210	Operate solids handling equipment		no change	E
PMAOPS211	Operate manufacturing extrusion systems		no change	E
PMAOPS213	Package product/material		no change	E
PMAOPS216	Operate local control system		no change	E
PMAOPS217	Operate wet milling equipment		no change	E
PMAOPS220	Monitor chemical reactions in the process		no change	E
PMAOPS221	Operate and monitor prime movers		no change	E
PMAOPS222	Operate and monitor pumping systems and equipment		no change	E
PMAOPS223	Operate and monitor valve systems		no change	E
PMAOPS224	Provide fluids for utilities and support		no change	E
PMAOPS226	Monitor and operate flare systems		no change	E
PMAOPS230	Monitor, operate and maintain pipeline stations and equipment		no change	E
PMAOPS231	Control gas odourisation		no change	E
PMAOPS232	Operate filtration equipment		no change	E
PMAOPS233	Monitor wells and gathering systems		no change	E
PMAOPS234	Monitor and operate low pressure compressors		no change	E
PMAOPS236	Monitor continuous process plant		no change	E
PMAOPS240	Store fluids in bulk		no change	E
PMAOPS241	Operate Joule-Thomson effect device		no change	E
PMAOPS242	Moor ships for transfer of bulk processed particulates or fluids		no change	E
PMAOPS246	Operate separation equipment		no change	E
PMAOPS247	Operate powered separation equipment		no change	E
PMAOPS260	Conduct screening operations		no change	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
PMAOPS261	Operate bulk solids loading equipment		no change	E
PMAOPS262	Operate digestion equipment		no change	E
PMAOPS263	Operate leaching equipment		no change	E
PMAOPS264	Operate solvent extraction equipment		no change	E
PMAOPS265	Operate magnetic/electrical separation equipment		no change	E
PMAOPS280	Interpret process plant schematics		no change	E
PMAOPS290	Operate a biotreater		no change	E
PMAOPS300	Operate a production unit	PMAOPS306	Operate and troubleshoot production unit	E
PMAOPS301	Operate a distillation unit	PMAOPS310	Operate and troubleshoot distillation system	E
PMAOPS302	Operate reactors and reaction equipment	PMAOPS311	Operate and troubleshoot reactors and reaction equipment	E
PMAOPS303	Operate furnaces to induce reaction	PMAOPS313	Operate and troubleshoot furnaces to induce reaction	E
PMAOPS304	Operate and monitor compressor systems and equipment	PMAOPS314	Operate and troubleshoot compressor systems	E
PMAOPS305	Operate process control systems	PMAOPS315	Operate and troubleshoot process control systems	E
PMAOPS307	Transfer bulk fluids into/out of storage facility	PMAOPS343	Transfer bulk fluids into/out of storage facility	E
PMAOPS308	Organise storage and logistics of general materials	PMAOPS316	Organise storage and logistics of general materials	E
PMAOPS309	Operate solids handling/storage facility		no change	E
PMAOPS312	Undertake ship loading/unloading operations	PMAOPS317	Undertake ship transfer operations	E
PMAOPS319	Adjust batch		no change	E
PMAOPS320	Conduct artificial lift	PMAOPS318	Conduct artificial lift	E
PMAOPS321	Undertake well management	PMAOPS322	Undertake well management	E
PMAOPS323	Operate and monitor heating furnace	PMAOPS328	Operate and troubleshoot heating furnace	E
PMAOPS324	Operate a gas turbine	PMAOPS331	Operate and troubleshoot gas turbine system	E
PMAOPS325	Generate electrical power	PMAOPS332	Generate electrical power	E
PMAOPS326	Operate gas absorption unit	PMAOPS334	Operate and troubleshoot gas absorption system	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
PMAOPS327	Operate fixed bed adsorption unit	PMAOPS336	Operate and troubleshoot fixed-bed adsorption system	E
PMAOPS329	Operate liquid extraction unit	PMAOPS337	Operate and troubleshoot liquid extraction system	E
PMAOPS330	Communicate and monitor pipeline activities	PMAOPS338	Communicate and monitor pipeline activities	E
PMAOPS333	Operate wells and gathering systems	PMAOPS339	Operate and troubleshoot wells and gathering systems	E
PMAOPS335	Conduct pipeline pigging	PMAOPS342	Conduct pipeline pigging	E
PMAOPS340	Operate cryogenic processes	PMAOPS341	Operate and troubleshoot cryogenic processes	E
		PMAOPS344	Operate and troubleshoot flare system	(Newly created)
		PMAOPS345	Operate and troubleshoot gas treatment process	(Newly created)
		PMAOPS346	Operate and troubleshoot liquefaction process	(Newly created)
		PMAOPS347	Create and conduct isolations in the workplace	(Newly created)
		PMAOPS348	Operate safety, protection and shutdown systems	(Newly created)
		PMAOPS349	Operate and troubleshoot hydraulic systems	(Newly created)
PMAOPS350	Match and adjust colour		no change	E
		PMAOPS351	Operate and troubleshoot turret swivel systems	(Newly created)
		PMAOPS352	Operate and troubleshoot instrument and plant air systems	(Newly created)
		PMAOPS353	Operate and troubleshoot heating, ventilation and air conditioning systems	(Newly created)
		PMAOPS354	Operate and troubleshoot inert gas generation systems	(Newly created)
		PMAOPS355	Operate and troubleshoot fuel systems	(Newly created)
		PMAOPS356	Operate and troubleshoot water treatment systems	(Newly created)
		PMAOPS357	Operate and troubleshoot produced water and water injection systems	(Newly created)
		PMAOPS358	Process design fundamentals	(Newly created)
		PMAOPS359	Operate and troubleshoot process measurement and control systems	(Newly created)
PMAOPS360	Operate a metalliferous		no change	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
	kiln/furnace			
PMAOPS361	Operate a smelting furnace		no change	E
PMAOPS362	Operate a blast furnace		no change	E
		PMAOPS363	Operate and troubleshoot export systems	(Newly created)
PMAOPS364	Operate an electrochemical process		no change	E
PMAOPS365	Operate pelletising equipment		no change	E
PMAOPS366	Operate sintering equipment		no change	E
		PMAOPS367	Operate and troubleshoot cooling water systems	(Newly created)
		PMAOPS368	Operate and troubleshoot heating medium/hot oil systems	(Newly created)
		PMAOPS369	Operate and troubleshoot drain and vent systems	(Newly created)
		PMAOPS370	Operate and troubleshoot condensate stabilisation systems	(Newly created)
PMAOPS390	Operate a biochemical process		no change	E
PMAOPS402	Respond to abnormal process situations		no change	E
PMAOPS405	Operate complex control systems		no change	E
PMAOPS410	Operate remote production facilities		no change	E
PMAOPS411	Manage plant shutdown and restart		no change	E
PMAOPS433	Manage wells and gathering systems		no change	E
PMAOPS434	Commission wells and gathering systems		no change	E
PMAOPS450	Solve colour problems		no change	E
PMAOPS460	Monitor and operate tailings management facilities		no change	E
PMAOPS500	Optimise production systems		no change	E
PMAOPS501	Provide operational expertise to a project team		no change	E
PMAOPS505	Control the process during abnormal situations		no change	E
PMAOPS511	Determine energy transfer loads		no change	E
PMAOPS512	Determine mass transfer		no change	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
	loads			
PMAOPS520	Manage utilities		no change	E
PMAOPS521	Plan plant shutdown		no change	E
PMAOPS522	Coordinate plant shutdown		no change	E
PMAOPS550	Develop a colour formulation		no change	E
PMAOPS560	Plan and design tailings management facilities		no change	E
PMAOPS600	Modify plant		no change	E
PMAOPS601	Debottleneck plant		no change	E
PMAOPS751	Apply physiochemical knowledge to select raw materials for surface coatings		no change	E
PMAOPS752	Develop a decorative coating		no change	E
PMAOPS753	Develop a non-decorative coating or ink		no change	E
PMAOPS755	Provide surface coatings application advice		no change	E
PMASMELT260	Form carbon anodes		no change	E
PMASMELT261	Bake carbon anodes		no change	E
PMASMELT262	Clean and strip anode rods		no change	E
PMASMELT263	Spray carbon anodes		no change	E
PMASMELT264	Start up reduction cells		no change	E
PMASMELT265	Operate reduction cells		no change	E
PMASMELT266	Deliver molten metal		no change	E
PMASMELT267	Cast ingots		no change	E
PMASMELT268	Operate vertical direct casting process		no change	E
PMASMELT269	Operate cell tending equipment		no change	E
PMASMELT270	Supply product from reduction cells		no change	E
PMASUP236	Operate vehicles in the field		no change	E
PMASUP237	Undertake crane, dogging and load transfer operations		no change	E
PMASUP241	Maintain pipeline easements		no change	E
PMASUP242	Monitor pipeline civil works		no change	E
PMASUP243	Monitor and maintain pipeline coatings		no change	E
PMASUP244	Prepare and isolate plant		no change	E
PMASUP245	Break and make flanged joints using hand tools		no change	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
PMASUP246	Disconnect and reconnect non-flared tube fitting joints		no change	E
PMASUP305	Operate offshore cranes		no change	E
PMASUP311	Operate communications hub		no change	E
PMASUP341	Monitor and maintain instrument and control systems		no change	E
PMASUP342	Monitor and maintain electrical systems		no change	E
PMASUP343	Monitor and maintain cathodic protection systems	PMASUP348	Monitor and maintain cathodic protection systems	E
PMASUP344	Monitor and control repairs and modifications on operational pipe	PMASUP349	Monitor and control repairs and modifications on operational pipe	E
PMASUP345	Monitor vibration		no change	E
PMASUP346	Control corrosion	PMASUP350	Control corrosion	E
PMASUP347	Undertake corrosion inspection on process plant		no change	E
PMASUP410	Develop plant documentation		no change	E
PMASUP420	Minimise environmental impact of process		no change	E
PMASUP432	Coordinate pipeline projects		no change	E
PMASUP440	Commission/ recommission plant		no change	E
PMASUP441	Decommission plant		no change	E
PMASUP444	Plan plant preparation and isolation		no change	E
PMASUP445	Participate in HAZOP studies		no change	E
PMASUP520	Review procedures to minimise environmental impact of process		no change	E
PMASUP540	Analyse equipment performance		no change	E
PMASUP620	Manage environmental management system		no change	E
PMAWHS211	Prepare equipment for emergency response		no change	E
PMAWHS213	Undertake fire control and emergency rescue (Release 1)	PMAWHS213	Undertake fire control and emergency rescue (Release 2)	E
PMAWHS214	Undertake helicopter safety and escape		no change	E
PMAWHS215	Apply offshore facility abandonment and sea		no change	E

PMA Release 1.0 Code	PMA Release 1.0 Title	PMA Release 2.0 Code	PMA Release 2.0 Title	E: Equivalent N: Not equivalent
	survival procedures and practices			
PMAWHS221	Maintain first aid resources and records		no change	E
PMAWHS310	Investigate incidents		no change	E
PMAWHS311	Lead emergency teams		no change	E
PMAWHS312	Command the operation of survival craft		no change	E
PMAWHS320	Provide advanced first aid response		no change	E
PMAWHS321	Provide first aid response in remote and/or isolated area		no change	E
PMAWHS420	Develop first aid procedures and manage resources		no change	E
PMAWHS502	Contribute to safety case		no change	E
PMAWHS511	Manage emergency incidents		no change	E

PMA Release 2.0 units mapped to PMA Release 1.0 units

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
PMAOMIR210	Control evacuation to muster point		no change	E
PMAOMIR301	Undertake initial rescue		no change	E
PMAOMIR302	Respond to a helideck incident		no change	E
PMAOMIR306	Operate control panel during an emergency	PMAOMIR305	Operate panel during an emergency	E
PMAOMIR317	Facilitate search and rescue operations		no change	E
PMAOMIR322	Manage incident response information	PMAOMIR320	Manage incident response information	E
PMAOMIR323	Manage communication systems during an incident	PMAOMIR321	Manage communication systems during an incident	E
PMAOMIR346	Assess and secure an incident site		no change	E
PMAOMIR407	Audit incident preparedness and established response systems		no change	E
PMAOMIR418	Coordinate incident response		no change	E
PMAOMIR424	Develop and maintain community relationships		no change	E
PMAOMIR430	Conduct and assess incident exercises		no change	E

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
PMAOMIR444	Develop incident containment tactics		no change	E
PMAOMIR449	Monitor legal compliance obligations during incidents		no change	E
PMAOMIR512	Establish incident response preparedness and response systems		no change	E
PMAOMIR523	Manage corporate media requirements in a crisis		no change	E
PMAOMIR575	Coordinate welfare support activities in response to an incident		no change	E
PMAOMIR622	Build partnerships to improve incident response capacity		no change	E
PMAOMIR650	Manage a crisis		no change	E
PMAOPS101	Read dials and indicators		no change	E
PMAOPS105	Select and prepare materials		no change	E
PMAOPS201	Operate fluid flow equipment		no change	E
PMAOPS202	Operate fluid mixing equipment		no change	E
PMAOPS204	Select and use utilities and services		no change	E
PMAOPS205	Operate heat exchangers		no change	E
PMAOPS208	Operate chemical separation equipment		no change	E
PMAOPS210	Operate solids handling equipment		no change	E
PMAOPS211	Operate manufacturing extrusion systems		no change	E
PMAOPS213	Package product/material		no change	E
PMAOPS216	Operate local control system		no change	E
PMAOPS217	Operate wet milling equipment		no change	E
PMAOPS220	Monitor chemical reactions in the process		no change	E
PMAOPS221	Operate and monitor prime movers		no change	E
PMAOPS222	Operate and monitor pumping systems and equipment		no change	E
PMAOPS223	Operate and monitor valve systems		no change	E
PMAOPS224	Provide fluids for utilities and support		no change	E

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
PMAOPS226	Monitor and operate flare systems		no change	E
PMAOPS230	Monitor, operate and maintain pipeline stations and equipment		no change	E
PMAOPS231	Control gas odourisation		no change	E
PMAOPS232	Operate filtration equipment		no change	E
PMAOPS233	Monitor wells and gathering systems		no change	E
PMAOPS234	Monitor and operate low pressure compressors		no change	E
PMAOPS236	Monitor continuous process plant		no change	E
PMAOPS240	Store fluids in bulk		no change	E
PMAOPS241	Operate Joule-Thomson effect device		no change	E
PMAOPS242	Moor ships for transfer of bulk processed particulates or fluids		no change	E
PMAOPS246	Operate separation equipment		no change	E
PMAOPS247	Operate powered separation equipment		no change	E
PMAOPS260	Conduct screening operations		no change	E
PMAOPS261	Operate bulk solids loading equipment		no change	E
PMAOPS262	Operate digestion equipment		no change	E
PMAOPS263	Operate leaching equipment		no change	E
PMAOPS264	Operate solvent extraction equipment		no change	E
PMAOPS265	Operate magnetic/electrical separation equipment		no change	E
PMAOPS280	Interpret process plant schematics		no change	E
PMAOPS290	Operate a biotreater		no change	E
PMAOPS306	Operate and troubleshoot production unit	PMAOPS300	Operate a production unit	E
PMAOPS310	Operate and troubleshoot distillation system	PMAOPS301	Operate a distillation unit	E
PMAOPS311	Operate and troubleshoot reactors and reaction equipment	PMAOPS302	Operate reactors and reaction equipment	E
PMAOPS313	Operate and troubleshoot furnaces to induce reaction	PMAOPS303	Operate furnaces to induce reaction	E

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
PMAOPS314	Operate and troubleshoot compressor systems	PMAOPS304	Operate and monitor compressor systems and equipment	E
PMAOPS315	Operate and troubleshoot process control systems	PMAOPS305	Operate process control systems	E
PMAOPS343	Transfer bulk fluids into/out of storage facility	PMAOPS307	Transfer bulk fluids into/out of storage facility	E
PMAOPS316	Organise storage and logistics of general materials	PMAOPS308	Organise storage and logistics of general materials	E
PMAOPS309	Operate solids handling/storage facility		no change	E
PMAOPS317	Undertake ship transfer operations	PMAOPS312	Undertake ship loading/unloading operations	E
PMAOPS319	Adjust batch		no change	E
PMAOPS318	Conduct artificial lift	PMAOPS320	Conduct artificial lift	E
PMAOPS322	Undertake well management	PMAOPS321	Undertake well management	E
PMAOPS328	Operate and troubleshoot heating furnace	PMAOPS323	Operate and monitor heating furnace	E
PMAOPS331	Operate and troubleshoot gas turbine system	PMAOPS324	Operate a gas turbine	E
PMAOPS332	Generate electrical power	PMAOPS325	Generate electrical Power	E
PMAOPS334	Operate and troubleshoot gas absorption system	PMAOPS326	Operate gas absorption unit	E
PMAOPS336	Operate and troubleshoot fixed-bed adsorption system	PMAOPS327	Operate fixed bed adsorption unit	E
PMAOPS337	Operate and troubleshoot liquid extraction system	PMAOPS329	Operate liquid extraction unit	E
PMAOPS338	Communicate and monitor pipeline activities	PMAOPS330	Communicate and monitor pipeline activities	E
PMAOPS339	Operate and troubleshoot wells and gathering systems	PMAOPS333	Operate wells and gathering systems	E
PMAOPS342	Conduct pipeline pigging	PMAOPS335	Conduct pipeline pigging	E
PMAOPS341	Operate and troubleshoot cryogenic processes	PMAOPS340	Operate cryogenic processes	E
PMAOPS344	Operate and troubleshoot flare system			(newly created)
PMAOPS345	Operate and troubleshoot gas treatment process			(newly created)
PMAOPS346	Operate and troubleshoot liquefaction process			(newly created)
PMAOPS347	Create and conduct isolations in the workplace			(newly created)
PMAOPS348	Operate safety, protection			(newly created)

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
	and shutdown systems			created)
PMAOPS349	Operate and troubleshoot hydraulic systems			(newly created)
PMAOPS350	Match and adjust colour		no change	E
PMAOPS351	Operate and troubleshoot turret swivel systems			(newly created)
PMAOPS352	Operate and troubleshoot instrument and plant air systems			(newly created)
PMAOPS353	Operate and troubleshoot heating, ventilation and air conditioning systems			(newly created)
PMAOPS354	Operate and troubleshoot inert gas generation systems			(newly created)
PMAOPS355	Operate and troubleshoot fuel systems			(newly created)
PMAOPS356	Operate and troubleshoot water treatment systems			(newly created)
PMAOPS357	Operate and troubleshoot produced water and water injection systems			(newly created)
PMAOPS358	Process design fundamentals			(newly created)
PMAOPS359	Operate and troubleshoot process measurement and control systems			(newly created)
PMAOPS360	Operate a metalliferous kiln/furnace		no change	E
PMAOPS361	Operate a smelting furnace		no change	E
PMAOPS362	Operate a blast furnace		no change	E
PMAOPS363	Operate and troubleshoot export systems			(newly created)
PMAOPS364	Operate an electrochemical process		no change	E
PMAOPS365	Operate pelletising equipment		no change	E
PMAOPS366	Operate sintering equipment		no change	E
PMAOPS367	Operate and troubleshoot cooling water systems			(newly created)
PMAOPS368	Operate and troubleshoot heating medium/hot oil systems			(newly created)
PMAOPS369	Operate and troubleshoot drain and vent systems			(newly created)
PMAOPS370	Operate and troubleshoot condensate stabilisation systems			(newly created)

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
PMAOPS390	Operate a biochemical process		no change	E
PMAOPS402	Respond to abnormal process situations		no change	E
PMAOPS405	Operate complex control systems		no change	E
PMAOPS410	Operate remote production facilities		no change	E
PMAOPS411	Manage plant shutdown and restart		no change	E
PMAOPS433	Manage wells and gathering systems		no change	E
PMAOPS434	Commission wells and gathering systems		no change	E
PMAOPS450	Solve colour problems		no change	E
PMAOPS460	Monitor and operate tailings management facilities		no change	E
PMAOPS500	Optimise production systems		no change	E
PMAOPS501	Provide operational expertise to a project team		no change	E
PMAOPS505	Control the process during abnormal situations		no change	E
PMAOPS511	Determine energy transfer loads		no change	E
PMAOPS512	Determine mass transfer loads		no change	E
PMAOPS520	Manage utilities		no change	E
PMAOPS521	Plan plant shutdown		no change	E
PMAOPS522	Coordinate plant shutdown		no change	E
PMAOPS550	Develop a colour formulation		no change	E
PMAOPS560	Plan and design tailings management facilities		no change	E
PMAOPS600	Modify plant		no change	E
PMAOPS601	Debottleneck plant		no change	E
PMAOPS751	Apply physiochemical knowledge to select raw materials for surface coatings		no change	E
PMAOPS752	Develop a decorative coating		no change	E
PMAOPS753	Develop a non-decorative coating or ink		no change	E
PMAOPS755	Provide surface coatings application advice		no change	E
PMASMELT260	Form carbon anodes		no change	E

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
PMASMELT261	Bake carbon anodes		no change	E
PMASMELT262	Clean and strip anode rods		no change	E
PMASMELT263	Spray carbon anodes		no change	E
PMASMELT264	Start up reduction cells		no change	E
PMASMELT265	Operate reduction cells		no change	E
PMASMELT266	Deliver molten metal		no change	E
PMASMELT267	Cast ingots		no change	E
PMASMELT268	Operate vertical direct casting process		no change	E
PMASMELT269	Operate cell tending equipment		no change	E
PMASMELT270	Supply product from reduction cells		no change	E
PMASUP236	Operate vehicles in the field		no change	E
PMASUP237	Undertake crane, dogging and load transfer operations		no change	E
PMASUP241	Maintain pipeline easements		no change	E
PMASUP242	Monitor pipeline civil works		no change	E
PMASUP243	Monitor and maintain pipeline coatings		no change	E
PMASUP244	Prepare and isolate plant		no change	E
PMASUP245	Break and make flanged joints using hand tools		no change	E
PMASUP246	Disconnect and reconnect non-flared tube fitting joints		no change	E
PMASUP305	Operate offshore cranes		no change	E
PMASUP311	Operate communications hub		no change	E
PMASUP341	Monitor and maintain instrument and control systems		no change	E
PMASUP342	Monitor and maintain electrical systems		no change	E
PMASUP348	Monitor and maintain cathodic protection systems	PMASUP343	Monitor and maintain cathodic protection systems	E
PMASUP349	Monitor and control repairs and modifications on operational pipe	PMASUP344	Monitor and control repairs and modifications on operational pipe	E
PMASUP345	Monitor vibration		no change	E
PMASUP350	Control corrosion	PMASUP346	Control corrosion	E
PMASUP347	Undertake corrosion inspection on process plant		no change	E
PMASUP410	Develop plant		no change	E

PMA Release 2.0 Code	PMA Release 2.0 Title	PMA Release 1.0 Code	PMA Release 1.0 Title	E: Equivalent N: Not equivalent
	documentation			
PMASUP420	Minimise environmental impact of process		no change	E
PMASUP432	Coordinate pipeline projects		no change	E
PMASUP440	Commission/ recommission plant		no change	E
PMASUP441	Decommission plant		no change	E
PMASUP444	Plan plant preparation and isolation		no change	E
PMASUP445	Participate in HAZOP studies		no change	E
PMASUP520	Review procedures to minimise environmental impact of process		no change	E
PMASUP540	Analyse equipment performance		no change	E
PMASUP620	Manage environmental management system		no change	E
PMAWHS211	Prepare equipment for emergency response		no change	E
PMAWHS213	Undertake fire control and emergency rescue (Release 1)	PMAWHS213	Undertake fire control and emergency rescue (Release 2)	E
PMAWHS214	Undertake helicopter safety and escape		no change	E
PMAWHS215	Apply offshore facility abandonment and sea survival procedures and practices		no change	E
PMAWHS221	Maintain first aid resources and records		no change	E
PMAWHS310	Investigate incidents		no change	E
PMAWHS311	Lead emergency teams		no change	E
PMAWHS312	Command the operation of survival craft		no change	E
PMAWHS320	Provide advanced first aid response		no change	E
PMAWHS321	Provide first aid response in remote and/or isolated area		no change	E
PMAWHS420	Develop first aid procedures and manage resources		no change	E
PMAWHS502	Contribute to safety case		no change	E
PMAWHS511	Manage emergency incidents		no change	E

Appendix 2: Australian Core Skills Framework mapping

Foundation skills are those core or essential skills we need to engage successfully in work and life. The core skills of the ACSF include:

- learning (L)
- reading (R)
- writing (W)
- oral communication (OC) and
- numeracy (N).

Unit code	Unit title	L	R	W	OC	N
PMAOMIR210	Control evacuation to muster point	2	-	2	3	2
PMAOMIR301	Undertake initial rescue	3	2	2	3	-
PMAOMIR302	Respond to a helideck incident	3	2	2	3	-
PMAOMIR306	Operate control panel during an emergency	3	3	2	4	3
PMAOMIR317	Facilitate search and rescue operations	3	2	2	3	-
PMAOMIR322	Manage incident response information	3	3	2	3	3
PMAOMIR323	Manage communication systems during an incident	3	3	2	3	-
PMAOMIR346	Assess and secure an incident site	3	3	3	3	-
PMAOMIR407	Audit incident preparedness and established response system	4	3	3	3	3
PMAOMIR418	Coordinate incident response	4	3	2	3	3
PMAOMIR424	Develop and maintain community relationships	4	2	3	3	2
PMAOMIR430	Conduct and assess incident exercises	4	2	2	3	-
PMAOMIR444	Develop incident containment tactics	4	3	4	3	2
PMAOMIR512	Establish incident response preparedness and response systems	5	4	4	4	2
PMAOMIR650	Manage a crisis	5	4	3	4	3
PMAOPS101	Read dials and indicators	1	2	2	2	2
PMAOPS105	Select and prepare materials	1	1	1	2	1
PMAOPS201	Operate fluid flow equipment	2	2	2	2	2
PMAOPS202	Operate fluid mixing equipment	2	2	2	2	2
PMAOPS204	Select and use utilities and services	2	2	2	2	2
PMAOPS205	Operate heat exchangers	2	2	2	2	2
PMAOPS208	Operate chemical separation equipment	2	2	2	2	2
PMAOPS210	Operate solids handling equipment	2	2	2	2	2
PMAOPS213	Package product/material	2	2	2	2	2
PMAOPS216	Operate local control system	2	2	2	3	3
PMAOPS217	Operate wet milling equipment	2	2	2	2	2
PMAOPS220	Monitor chemical reactions in the process	2	2	2	2	2
PMAOPS221	Operate and monitor prime movers	2	2	2	2	2
PMAOPS222	Operate and monitor pumping systems and equipment	2	2	2	2	2
PMAOPS223	Operate and monitor valve systems	2	2	2	2	2

Unit code	Unit title	L	R	W	OC	N
PMAOPS224	Provide fluids for utilities and support	2	2	2	2	2
PMAOPS226	Monitor and operate flare systems	2	2	2	3	2
PMAOPS230	Monitor, operate and maintain pipeline stations and equipment	2	3	2	3	3
PMAOPS231	Control gas odourisation	2	2	2	3	3
PMAOPS232	Operate filtration equipment	2	2	2	3	3
PMAOPS233	Monitor wells and gathering systems	2	2	2	3	2
PMAOPS234	Monitor and operate low pressure compressors	2	2	2	2	2
PMAOPS236	Monitor continuous process plant	2	2	2	3	3
PMAOPS240	Store fluids in bulk	2	2	2	2	2
PMAOPS241	Operate Joule-Thomson effect device	2	2	2	2	2
PMAOPS246	Operate separation equipment	2	2	2	2	2
PMAOPS247	Operate powered separation equipment	2	2	2	2	2
PMAOPS260	Conduct screening operations	2	2	2	2	2
PMAOPS261	Operate bulk solids loading equipment	2	2	2	2	2
PMAOPS262	Operate digestion equipment	2	2	2	2	2
PMAOPS264	Operate solvent extraction equipment	2	2	2	2	2
PMAOPS280	Interpret process plant schematics	2	2	1	2	3
PMAOPS306	Operate and troubleshoot production unit	3	3	2	3	3
PMAOPS309	Operate solids handling/storage equipment	3	3	2	3	3
PMAOPS310	Operate and troubleshoot distillation system	3	3	2	3	3
PMAOPS311	Operate and troubleshoot reactors and reaction equipment	3	3	2	3	3
PMAOPS313	Operate and troubleshoot furnaces to induce reaction	3	3	2	3	3
PMAOPS314	Operate and troubleshoot compressor systems	3	3	2	3	3
PMAOPS315	Operate and troubleshoot process control systems	2	2	2	3	3
PMAOPS316	Organise storage and logistics of general materials	3	3	2	3	2
PMAOPS317	Undertake ship transfer operations	3	3	2	3	3
PMAOPS318	Conduct artificial lift	3	3	2	3	3
PMAOPS319	Adjust batch	3	3	2	3	3
PMAOPS322	Undertake well management	3	3	2	3	3
PMAOPS328	Operate and troubleshoot heating furnace	3	3	2	3	3
PMAOPS331	Operate and troubleshoot gas turbine system	3	3	2	3	3
PMAOPS332	Generate electrical power	3	3	2	3	3
PMAOPS334	Operate and troubleshoot gas absorption system	3	3	2	3	3
PMAOPS336	Operate and troubleshoot fixed-bed adsorption system	3	3	2	3	3
PMAOPS337	Operate and troubleshoot liquid extraction system	3	3	2	3	3
PMAOPS338	Communicate and monitor pipeline activities	3	3	2	3	3
PMAOPS339	Operate and troubleshoot wells and gathering systems	3	3	2	3	3
PMAOPS341	Operate and troubleshoot cryogenic processes	2	2	2	3	3
PMAOPS342	Conduct pipeline pigging	3	3	2	3	3
PMAOPS343	Transfer bulk fluids into/out of storage facility	3	3	2	3	3
PMAOPS344	Operate and troubleshoot flare system	3	3	2	3	3
PMAOPS345	Operate and troubleshoot gas treatment process	3	3	2	3	3

Unit code	Unit title	L	R	W	OC	N
PMAOPS346	Operate and troubleshoot liquefaction process	3	3	2	3	3
PMAOPS347	Create and conduct isolations in the workplace	3	3	2	3	3
PMAOPS348	Operate safety, protection and shut down systems	3	3	2	3	3
PMAOPS349	Operate and troubleshoot hydraulic systems	3	3	2	3	3
PMAOPS350	Match and adjust colour	3	3	2	3	3
PMAOPS351	Operate and troubleshoot turret swivel systems	3	3	2	3	3
PMAOPS352	Operate and troubleshoot instrument and plant air systems	3	3	2	3	3
PMAOPS353	Operate and troubleshoot heating, ventilation and air conditioning systems	3	3	2	3	3
PMAOPS354	Operate and troubleshoot inert gas generation systems	3	3	2	3	3
PMAOPS355	Operate and troubleshoot fuel systems	3	3	2	3	3
PMAOPS356	Operate and troubleshoot water treatment systems	3	3	2	3	3
PMAOPS357	Operate and troubleshoot produced water and water injection systems	3	3	2	3	3
PMAOPS358	Process design fundamentals	3	3	2	3	3
PMAOPS359	Operate and troubleshoot process measurement and control systems	3	3	2	3	3
PMAOPS360	Operate a metalliferous kiln/furnace	3	2	2	3	3
PMAOPS363	Operate and troubleshoot export systems					
PMAOPS367	Operate and troubleshoot cooling water systems	3	3	2	3	3
PMAOPS368	Operate and troubleshoot heating medium/hot oil systems	3	3	2	3	3
PMAOPS369	Operate and troubleshoot drain and vent systems	3	3	2	3	3
PMAOPS370	Operate and troubleshoot condensate stabilisation systems	3	3	2	3	3
PMAOPS390	Operate a biochemical process	3	2	2	3	3
PMAOPS402	Respond to abnormal process situations	4	4	3	5	4
PMAOPS405	Operate complex control systems	4	3	3	4	3
PMAOPS410	Operate remote production facilities	4	3	3	4	3
PMAOPS411	Manage plant shutdown and restart	4	3	3	3	3
PMAOPS433	Manage wells and gathering systems	4	3	3	3	3
PMAOPS434	Commission wells and gathering systems	4	3	3	3	3
PMAOPS450	Solve colour problems	4	3	3	3	3
PMAOPS460	Monitor and operate tailings management facilities	4	3	3	3	3
PMAOPS500	Optimise production systems	5	4	4	4	4
PMAOPS501	Provide operational expertise to a project team	5	4	4	4	3
PMAOPS505	Control the process during abnormal situations	5	4	3	4	3
PMAOPS511	Determine energy transfer loads	5	4	3	3	4
PMAOPS512	Determine mass transfer loads	5	4	3	3	4
PMAOPS520	Manage utilities	5	4	3	3	4
PMAOPS521	Plan plant shutdown	5	4	3	4	4
PMAOPS522	Coordinate plant shut down	5	3	3	3	3
PMAOPS600	Modify plant	5	4	3	4	3
PMAOPS601	Debottleneck plant	5	4	3	4	4

Unit code	Unit title	L	R	W	OC	N
PMASMELT260	PMASMELT260 Form carbon anodes	2	2	2	2	2
PMASMELT261	PMASMELT261 Bake carbon anodes	2	2	2	2	2
PMASMELT262	PMASMELT262 Clean and strip anode rods	2	2	2	2	2
PMASMELT263	PMASMELT263 Spray carbon anodes	2	2	2	2	2
PMASMELT264	PMASMELT264 Start up reduction cells	2	2	2	2	2
PMASMELT265	Operate reduction cells	2	2	2	2	2
PMASMELT266	PMASMELT266 Deliver molten metal	2	2	2	2	2
PMASMELT267	PMASMELT267 Cast ingots	2	2	2	2	2
PMASMELT268	PMASMELT268 Operate vertical direct casting process	2	2	2	2	2
PMASMELT269	PMASMELT269 Operate cell tending equipment	2	2	2	2	2
PMASMELT270	PMASMELT270 Supply product from reduction cells	2	2	2	2	2
PMASUP236	Operate vehicles in the field	2	3	2	2	2
PMASUP237	Undertake crane, dogging and load transfer operations	2	2	2	2	2
PMASUP241	Maintain pipeline easements	2	3	2	2	2
PMASUP242	Monitor pipeline civil works	2	2	2	2	2
PMASUP243	Monitor and maintain pipeline coatings	2	2	2	2	2
PMASUP244	Prepare and isolate plant	2	3	2	2	2
PMASUP245	Break and make flanged joints using hand tools	2	2	2	2	2
PMASUP246	Disconnect and reconnect non-flared tube fitting joints	2	2	2	2	2
PMASUP305	Operate Offshore Cranes	3	2	2	2	2
PMASUP311	Operate communications hub	3	2	2	2	2
PMASUP341	Monitor and maintain instrument and control systems	3	2	3	2	3
PMASUP342	Monitor and maintain electrical systems	3	3	3	2	3
PMASUP348	Monitor and maintain cathodic protection systems	3	3	3	2	2
PMASUP349	Monitor and control repairs and modifications on operational pipe	3	3	2	3	2
PMASUP345	Monitor vibration	3	2	2	2	2
PMASUP350	Control corrosion	3	2	2	2	2
PMASUP410	Develop plant documentation	4	3	4	3	3
PMASUP420	Minimise environmental impact of process	4	3	3	3	4
PMASUP440	Commission/recommission plant	4	4	4	4	3
PMASUP441	Decommission plant	4	4	4	4	3
PMASUP444	Plan plant preparation and isolation	4	4	4	4	3
PMASUP445	Participate in HAZOP studies	4	3	3	4	3
PMASUP520	Review procedures to minimise environmental impact of process	5	4	4	4	3
PMASUP540	Analyse equipment performance	5	4	3	3	4
PMAWHS211	Prepare equipment for emergency response	2	2	1	1	2
PMAWHS213	Undertake fire control and emergency rescue	2	-	-	3	-
PMAWHS214	Undertake helicopter safety and escape	2	-	-	3	-
PMAWHS215	Apply offshore facility abandonment and sea survival procedures	2	-	-	2	-
PMAWHS310	Investigate incidents	3	3	3	3	2
PMAWHS311	Lead emergency teams	3	2	-	3	2

Unit code	Unit title	L	R	W	OC	N
PMAWHS312	Command the operation of survival craft	3	3	2	3	2
PMAWHS320	Provide advanced first aid response	3	3	2	3	2
PMAWHS502	Contribute to safety case	5	3	3	4	3
PMAWHS511	Manage emergency incidents	5	4	4	5	3

Appendix 3: Employability skills in PMA qualifications

The employability skills for each PMA qualification are included below.

PMA20116 Certificate II in Process Plant Operations

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Accessing and interpreting standardised documentation • Completing all reporting as required • Asking questions to increase understanding about workplace procedures • Reading and interpreting instructions • Responding to information • Accessing and using communication tools and equipment • Applying numeracy skills to work procedures
Teamwork	• Working effectively with others • Sharing information with peers • Understanding role of individual within team process • Seeking assistance with work operations as required
Problem solving	• Recognising common problems and reporting inconsistencies • Monitoring the job and making improvements • Responding to routine problems • Recommending improvements
Initiative and enterprise	• Taking correct action and following procedures • Recommending changes and improvements • Taking action to make improvements • Adopting changes in accordance with procedures
Planning and organising	• Planning own work • Organising processes, tools and materials • Monitoring own work outcomes • Organising and planning activities • Collecting and organising information for work activity
Self-management	• Conducting all activities according to safety standards • Maintaining housekeeping standards • Achieving planned outcomes within time constraints • Monitoring own work performance • Assessing own work • Seeking assistance where appropriate
Learning	• Asking questions to aid learning • Identifying own skill requirements • Asking questions to ensure understanding of own work requirements
Technology	• Using equipment and/or information technology • Identifying equipment appropriate for job • Using simple measuring devices • Collecting and applying data and information from technology

PMA30120 Certificate III in Process Plant Operations

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Maintaining communication about multiple subjects and with multiple audiences • Completing incident and other reports • Using technical information and manufacturer information • Collecting, analysing and organising information • Communicating ideas and information • Using and contributing to workplace documentation • Maintaining workplace records
Teamwork	• Identifying and describing own role and role of others • Working within a team • Resolving conflicts between team members • Using teamwork strategies
Problem solving	• Recognising problems or potential problems • Determining problems needing priority action • Referring problems outside area of responsibility to appropriate person with possible causes • Identifying appropriate theory base for problem • Seeking information and assistance as required to solve problems • Solving problems within area of responsibility • Following through items initiated until final resolution has occurred • Identifying and isolating faults in equipment • Using a range of formal problem-solving techniques
Initiative and enterprise	• Identifying the most appropriate process conditions for equipment • Determining problems needing action • Recommending required action • Reporting problems outside area of responsibility • Distinguishing between causes of faults
Planning and organising	• Prioritising actions to achieve required outcomes • Planning own work requirements and assisting others to plan theirs • Planning and organising activities • Identifying tasks to achieve team goals • Organising allocation of tasks • Monitoring completion of allocated tasks • Developing and adjusting a production schedule
Self-management	• Planning own work requirements from job shift needs • Operating within appropriate time constraints and work standards • Selecting and using appropriate equipment, materials, processes and procedures • Planning to ensure effective production • Applying standard procedures • Identifying, documenting and monitoring resource requirements • Recognising limitations and seeking timely advice
Learning	• Asking questions to gain information

Employability Skill	Industry/enterprise requirements for this qualification include:
	- Identifying sources of information to expand knowledge and understanding - Participating in improvement procedures - Participating in development of continuous improvement strategies - Helping others develop competency
Technology	- Operating and adjusting equipment - Starting up and shutting down equipment - Setting up equipment - Monitoring quality - Understanding function and operating principles of equipment - Maintaining workplace records

PMA40116 Certificate IV in Process Plant Technology

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	- Completing workplace documentation and records - Using communication technologies efficiently - Developing work instructions, specifications and procedures - Communicating with all team members - Demonstrating effective and appropriate communication and interpersonal skills when dealing with clients - Using most appropriate communication method given priority, cost and customer facilities - Accessing, interpreting and applying technical information
Teamwork	- Working cooperatively with people of different ages, gender, race or religion - Liaising with and providing support to other team members - Working as part of a team - Identifying and managing performance required to meet internal and external customer needs in own work and team - Managing technical processes and providing problem-solving support to others
Problem solving	- Investigating problem causes - Identifying, rectifying or reporting potential difficulties associated with the process or plant - Identifying environmental features, regulations, legal requirements, industry codes and other factors which may affect the process or plant - Using material and process knowledge to solve problems - Identifying hazards and suggesting control measures - Determining production requirements
Initiative and enterprise	- Seeking feedback on products, processes and procedures - Gathering and analysing information and applying to work-related processes - Recording information on the quality and other indicators of products - Supporting achievement of efficient production processes - Determining and acting on situations requiring further information or problem solving
Planning and organising	- Identifying hazards and implementing appropriate hazard control measures - Demonstrating time-management skills

Employability Skill	Industry/enterprise requirements for this qualification include:
	• Sourcing and preparing materials and resources • Sequencing work to maximise safety and productivity
Self-management	• Applying relevant Acts, regulations and codes as expressed through policy and procedures • Keeping the work area clean and tidy at all times • Monitoring own work and work of team, and identifying and acting on any quality issues • Understanding own work activities • Managing own time to meet deadlines • Implementing workplace procedures and instructions
Learning	• Implementing learning activities as appropriate to ensure achievement of specified production requirements • Assessing competencies in meeting job requirements • Being supportive and assertive, and using interpersonal skills • Identifying own training needs and seeking skill development if required • Gathering feedback on own work to assess effectiveness in meeting objectives and integrating information into own practice
Technology	• Using computer software applications effectively • Working with technology safely and according to workplace standards • Helping others use technology efficiently and safely

PMA50116 Diploma of Process Plant Technology

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Managing implementation of workplace health and safety (WHS) procedures, and developing and distributing related safety information • Developing standardised documentation on behalf of an area or group of work teams • Sharing and discussing information with others about enterprise activities • Developing and communicating workplace procedures • Providing information and clarifications to team leaders and other employees on workplace procedures • Providing and interpreting instructions, specifications, standard operating procedures (SOPs) and other work-related documents • Providing assistance or information to relevant personnel • Debriefing on workplace changes with relevant stakeholders • Recording production or other work-related information • Accessing and using workplace communication tools and equipment • Applying numeracy skills to work procedures • Providing information about team activities to managers, supervisors and customers
Teamwork	• Identifying roles of work teams where teamwork is used as the form of work organisation • Supervising and leading others in a production environment • Sharing production or work-related information with peers, including team members, supervisors and management • Identifying hazards to employees and visitors • Identifying the value chain and advising other employees as to how they can

Employability Skill	Industry/enterprise requirements for this qualification include:
	contribute to the final quality of the product • Reviewing changes to work practices and work relationships with team leaders and other employees • Providing assistance with planning work operations, as required • Seeking assistance with work operations from specialists and other employees, as required • Participating in multidisciplinary teams, as required
Problem solving	• Monitoring production and maintenance activities • Analysing inconsistencies, non-compliances, faults or hazards • Identifying factors within work area that are a constraint to work efficiency or reaching of production outcomes • Identifying essential and non-essential practices • Implementing methods of increasing features/benefits of products or processes • Monitoring responsibilities of teams and making improvements to work organisation • Identifying process steps which cause a problem and implementing improvement processes • Monitoring WHS performance and implementing WHS improvement processes • Comparing shift or area required performance with actual performance • Identifying situations where compliance to specifications or safety standards is unlikely • Identifying, recommending and implementing improvements • Distinguishing between random and identifiable causes of work problems • Identifying causes of identified faults and taking appropriate action • Investigating causes of quality deviations • Undertaking root cause analysis • Identifying deviations and fault patterns
Initiative and enterprise	• Managing procedures and systems for optimum outcomes • Analysing feedback on procedures and systems • Analysing problems, implications or suggestions for improvements • Adjusting work activities according to changes in customer requirements • Identifying methods of increasing contribution of work teams to the value chain • Identifying and implementing changes and improvements • Monitoring processes and equipment to ensure cost-efficiency • Implementing and monitoring work practices to reduce waste • Participating in multidisciplinary teams to develop new products or processes
Planning and organising	• Planning work of teams to meet required standards • Ensuring work areas comply with WHS procedures • Identifying and managing processes, tools and materials • Implementing improvements in accordance with procedures • Monitoring and adjusting production/process • Distinguishing between essential and non-essential practices • Implementing use of planning tools within work of teams • Determining and prioritising required actions

Employability Skill	Industry/enterprise requirements for this qualification include:
	- Collecting, organising and analysing information from work activities - Monitoring work activities according to safety and workplace standards - Interpreting data and information as required by own job - Asking questions to ensure understanding of work requirements in teams and among other employees
Self-management	- Recommending methods of increasing own contribution to the value chain - Adjusting work processes according to procedures and customer requirements - Identifying and managing impact of change in own work - Minimising waste in own work activity - Assessing own work performance - Setting personal objectives for work performance - Managing own time
Learning	- Identifying skill requirements of self and team members - Arranging skill development training for self and others - Adapting to changing work requirements - Asking questions to aid learning of others - Identifying personal skill gaps and additional skills needs - Asking questions to ensure understanding of own work requirements - Monitoring own work and identifying areas for improvement - Seeking feedback on work performance - Providing feedback on work performance to team leaders and team members
Technology	- Monitoring technology to ensure safety according to legislative requirements and workplace standards - Identifying equipment and processes appropriate for jobs and skill levels of employees - Providing appropriate equipment to ensure safety and efficiency according to skill levels of employees - Assessing operational efficiency of technology within own skill level and that of team members - Acting on reports of faulty operation of equipment - Analysing data and other information from equipment reports - Conducting failure mode effects analyses - Using information technology appropriate for job - Managing maintenance procedures appropriate to job and processes according to skill levels of team members

PMA60116 Advanced Diploma of Process Plant Technology

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	- Managing implementation of procedures, and developing and distributing related information - Disseminating and explain information on plant, process and feed changes - Developing standardised documentation on behalf of an area or group of work teams - Sharing and discussing information with others about enterprise activities - Providing information and clarifications to team leaders and other employees

Employability Skill	Industry/enterprise requirements for this qualification include:
	on workplace procedures • Providing and interpreting instructions, specifications, standard operating procedures (SOPs) and other work-related documents • Providing assistance or information to relevant personnel • Debriefing on workplace changes with relevant stakeholders • Monitoring production or other work-related information and proactively taking action • Accessing and using workplace communication tools and equipment • Applying numeracy skills to work procedures • Providing information about team activities to managers, supervisors and customers
Teamwork	• Discuss development opportunities with appropriate personnel to assess and confirm requirements • Developing team members through motivating, mentoring, coaching and promoting team cohesion to achieve planned outcomes • Supervising and leading others in a production environment • Sharing production or work-related information with peers, including team members, supervisors and management • Identifying hazards to employees and visitors • Identifying the value chain and advising other employees as to how they can contribute to the final quality of the product • Reviewing changes to work practices and work relationships with team leaders and other employees • Providing assistance with planning work operations, as required • Seeking assistance with work operations from specialists and other employees, as required • Participating in multidisciplinary teams, as required
Problem solving	• Proposing or undertaking process and/or plant changes to make improvements • Monitoring production and maintenance activities • Analysing inconsistencies, non-compliances, faults or hazards • Identifying factors within work area that are a constraint to work efficiency or reaching of production outcomes • Identifying essential and non-essential practices • Implementing methods of increasing features/benefits of products or processes • Monitoring responsibilities of teams and making improvements to work organisation • Identifying process steps which cause a problem and implementing improvement processes • Monitoring WHS performance and implementing WHS improvement processes • Comparing shift or area required performance with actual performance
	• Identifying situations where compliance to specifications or safety standards is unlikely • Identifying, recommending and implementing improvements • Distinguishing between random and identifiable causes of work problems • Identifying causes of identified faults and taking appropriate action • Investigating causes of quality deviations

Employability Skill	Industry/enterprise requirements for this qualification include:
	• Undertaking root cause analysis • Identifying deviations and fault patterns
Initiative and enterprise	• Identify areas for systems improvement • Developing and introduce practices to improve the work environment • Recommending improvements for future projects • Managing procedures and systems for optimum outcomes • Analysing feedback on procedures and systems • Analysing problems, implications or suggestions for improvements • Adjusting work activities according to changes in customer requirements • Identifying methods of increasing contribution of work teams to the value chain • Identifying and implementing changes and improvements • Monitoring processes and equipment to ensure cost-efficiency • Implementing and monitoring work practices to reduce waste • Participating in multidisciplinary teams to develop new products or processes
Planning and organising	• Organising and optimising the use of resources within agreed parameters to achieve planned outcomes • Planning work of teams to meet required standards • Ensuring work areas comply with WHS procedures • Identifying and managing processes, tools and materials • Implementing improvements in accordance with procedures • Monitoring and adjusting production/process • Distinguishing between essential and non-essential practices • Implementing use of planning tools within work of teams • Determining and prioritising required actions • Collecting, organising and analysing information from work activities • Monitoring work activities according to safety and workplace standards • Interpreting data and information as required by own job • Asking questions to ensure understanding of work requirements in teams and among other employees • Determine resource requirements, including personnel, time, equipment and materials • Collecting relevant information from manuals, specification sheets, diagnostic equipment and software
Self-management	• Recognising limits of own expertise and make decisions within limits of responsibility and authority • Ensuring work practices are conducted in an ethical and professional manner • Recommending methods of increasing own contribution to the value chain • Adjusting work processes according to procedures and customer requirements • Identifying and managing impact of change in own work • Minimising waste in own work activity • Assessing own work performance • Setting personal objectives for work performance • Managing own time

Employability Skill	Industry/enterprise requirements for this qualification include:
Learning	• Consulting specialists as necessary
	• Providing information to employees and develop and implement training programs • Maintaining knowledge of current and new requirements impacting on work/functional area • Providing coaching and mentoring support to personnel to change work practices such as difficulties with meeting targets for performance • Identifying skill requirements of self and team members • Arranging skill development training for self and others • Adapting to changing work requirements • Asking questions to aid learning of others • Identifying personal skill gaps and additional skills needs • Asking questions to ensure understanding of own work requirements • Monitoring own work and identifying areas for improvement • Seeking feedback on work performance • Providing feedback on work performance to team leaders and team members
Technology	• Monitoring technology to ensure safety according to legislative requirements and workplace standards • Identifying equipment and processes appropriate for jobs and skill levels of employees • Providing appropriate equipment to ensure safety and efficiency according to skill levels of employees • Assessing operational efficiency of technology within own skill level and that of team members • Acting on reports of faulty operation of equipment • Analysing data and other information from equipment reports • Conducting failure mode effects analyses • Using information technology appropriate for job • Managing maintenance procedures appropriate to job and processes according to skill levels of team members

Appendix 4: Technical terms and definitions

Term	Definition
Abnormal situation	A situation that might affect standard operating procedures. Management of abnormal situations may require using standard operating procedures, site procedures and other procedural documents. Operator craft could be demonstrated in managing an abnormal situation.
Ancillary equipment	Ancillary equipment includes all that equipment which, while not part of the unit operation being employed, is necessary for it to function.
Hazard	A hazard is anything that has the potential to cause harm to people, the environment or plant.
Human factors	The application of what we know about human capabilities and limitations in order to maximise overall system performance. By giving careful consideration to the interactions between humans and the technological and organisational elements of a system it is possible to significantly increase the system's productivity and reliability.
Items	Items on schematic/in plant includes: - all major plant items such as: - vessels - columns - reactors - heat exchangers - minor plant items such as: - pumps - valves - strainers - filters - instrumentation (local and remote).
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.
Operate	Operate is to monitor, adjust/change the plant item/unit/ system to meet specifications, by one or more of: - manually in the plant - using local controller in the plant - using the process control system in the control room.
Plant preparation	Plant preparation entails all that activity which may be required to render the plant safe for non-operational work (which is typically maintenance but may be other work) and includes: - isolations - blank/spade/spectacle blind, breakout spool locations - draining - purging - blanketing - venting

Term	Definition
	• ventilating • locating plant, equipment and services - above ground • locating below ground (or otherwise obscured) pipeline and services.
Procedures	All operations must be performed in accordance with relevant procedures. Procedures may be written, verbal, visual, computer-based or in some other form. They include one or any combination of: • emergency procedures • work instructions • standard operating procedures • safe work method statements • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant.
Process system	This includes all plant, major components and equipment that are operated together as the process to produce the product.
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.
Red Line mark-up process	Operational documentation and schematics are managed through a continuous improvement cycle that ensures any modification or change in plant is captured and included in future documentation. This process involves marking up the changes on the relevant documentation and progressing the change through a managed process. The process is often referred to as the Red Line mark-up process.
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 and safety legislation, codes of practice and guidance material • environmental regulations and guidelines • other relevant government legislation, regulations and codes • Australian and other standards • other relevant codes and standards • licence and certification requirements. The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed. All operations 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.
Remedial actions	Remedial actions may include, but are not limited to: • making adjustments to the equipment (flow, pressure, etc.) • carrying out minor maintenance within operator's skill level • identifying and reporting problems outside operator's scope of ability • identifying and controlling hazards related to digestion equipment and surrounding areas.
Routine check reads and logs	Routine check reads and logs include as appropriate to the plant one or more of: • levels

Term	Definition
	- temperatures (inlet and outlet) - pressures (inlet and outlet) - speed and may be paper or electronic based, or verbal/radio reports.
Routine problems	Routine problems are known problems with known solutions. The known solutions are drawn from one or more of: - procedures - training - remembered experience.
Safety components	Safety components include, but are not limited to pressure safety valves (PSV), process shutdown (PSD), emergency shutdown (ESD), safety instrumented systems (SIS).
Schematics	Schematics are formally drawn, authorised diagrams and may be hard copy or electronic. Schematics have various names; examples include: - P&IDs (piping and instrumentation diagrams) - PFDs (process flow diagrams) - PEFs (process engineering flow) - cause and effect diagrams/matrixes. Manual schematics includes one or both of the following: - a hand-drawn sketch of the part of the process of interest - a mark-up of a formally drawn schematic. Where schematics are included in the Assessment Requirements, industry has recommended it is a requirement that the assessment process involves drawing basic process schemes as they relate to the system.
Shutdown	Shutdown may be: - a normal shut down - a plant trip - an emergency shutdown. Some plants are designed to run for years without being shut down. In these cases, simulation is appropriate for assessment purposes.
Start-up	Start-up needs to be able to be done with the rest of the plant on line/in its normal condition for a start-up, and also from where the item is isolated, cold and empty (which may or may not be a black start).
Symbols	Symbols and conventions used in the schematics for the relevant plant area should be used. They may be Australian Standards symbols, the organisation's standard symbols or some other standard system.
Unit operation	A 'unit operation' is 'a basic step in a process' (Wikipedia) 'any part of potentially multiple-step process which can be considered to have a single function' (Walker, Lewis and McAdams 'The Principles of Chemical Engineering'). Any unit operation has and applies common techniques and principles. A total process may be designed as a collection of appropriately sized and connected unit operations.
Work lists	Work lists include one or more of: - punch list - tag numbers

Term	Definition
	• spade/blind lists • similar lists.
Work requirements	Work requirements may come from briefings, handovers and work orders and include one or more of: • compliance documentation • product specifications • nature and scope of tasks • achievement targets • operational conditions • plant or equipment defects • hazards and potential hazards • coordination requirements or issues.

Appendix 5: Towards a taxonomy for Process Manufacturing

Andragogical basis

There are two main bases for comparison:

- Bloom's taxonomy
- The AQF descriptors.

Bloom's taxonomy

Bloom's taxonomy of the cognitive domain is about the levels of cognitive processing and is composed of six levels:

1. Knowledge (recall, recognition) aka remembering
2. Comprehension (interprets) aka understanding
3. Application (uses information to complete a problem) aka applying
4. Analysis (distinguishes, classifies) aka analysing
5. Synthesis (combines ideas into new information) aka creating
6. Evaluation (assesses based on criteria) aka evaluating 5 and 6 have also switched places.

There are similar taxonomies for the affective and psychomotor domains.

AQF descriptors

The AQF second edition has ten levels, of which six are of particular relevance to VET sector training package qualifications. There is no intention of the AQF aligning with Bloom's or any other taxonomy. However, a taxonomy is implied by the level descriptors of the AQF, which use the three domains of knowledge, skills and application. The first six levels are:

1. Foundational knowledge, applied in narrow contexts
2. Basic factual knowledge, solve predictable problems, limited judgement, structured contexts
3. Theoretical knowledge, solve some unpredictable problems, stable contexts
4. Broad knowledge, non-routine activities, judgement within changing contexts
5. Specialised knowledge, analyse information and solve complex problems within broad contexts
6. Broad knowledge, interpret and analyse information, autonomy and judgement

Clearly there is not a direct correlation between Bloom's and AQF (nor is there intended to be), but there are some points of contact. The advantage of finding some points of contacts is that there are already established lists of verbs which can serve as the basis for a taxonomy.

Points of contact

'Evaluation' doesn't occur in the AQF until AQF 7. Transforming information appears at AQF 8. So, it appears that AQF 1–6 is contained within Bloom's 1–4.

Analysis (Bloom 4) seems to appear at AQF 5 whereas recall (Bloom 1) seems to be all that is required at AQF 2.

This means that a single level in Bloom's taxonomy may well apply at two AQF levels.

This is unsurprising as the AQF was developed around the structure work of (the largely blue collar) workforce, and without significant regard for any particular educational hierarchy (cognitive, affective or psychomotor). These education domains become important, however, when constructing relevant learning and assessment resources.

Process manufacturing taxonomy

This table is to be referred to for the purposes of inspiration and consistency and added to as required. The Bloom's verbs have been added from literature and may appear at different levels. We should try to avoid this.

Taxonomic table

Bloom's Taxonomy	AQF levels	Bloom's verbs	PM verbs
	AQF 1		
Remembering	AQF 2	Define, Describe, Draw, Find, Identify, Know, Label, List, Locate, Match, Name, Outline, Recall, Recognise, Reproduce, Retrieve, Select, State, Write	Apply, Describe, Identify, List, Locate, State, Find out, Define (as in draw a boundary around)
Understanding	AQF 3	Classify, Compare, Comprehend, Conclude, Convert, Defend, Describe, Discuss, Distinguish, Estimate, Extend, Explain, Generalise, Give an example, Illustrate, Infer, Interpret, Paraphrase, Predict, Report, Rewrite, Summarise, Translate	Explain, Operate, Identify, Interpret, Report
Applying	AQF 4	Apply, Carry out, Change, Choose, Classify, Compute, Construct, Demonstrate, Discover, Execute, Implement, Interview, Manipulate, Modify, Operate, Predict, Prepare, Produce, Relate, Run, Select, Show, Solve, transfer, Use	Consult, Ensure, Implement, Lead
Analysing	AQF 5	Analyse, Attribute, Break down, Categorise, Characterise, Classify, Compare, Contrast, Deconstruct, Deduce, Differentiate, Discriminate, Distinguish, Examine, Identify, Illustrate, Infer, Integrate, Organise, Outline, Relate, Research, Select, Separate, Structure	Analyse, Categorise, Determine, Develop, Differentiate, Distinguish, Determine, Develop, Facilitate, Recommend, Review

Bloom's Taxonomy	AQF levels	Bloom's verbs	PM verbs
	AQF 6		

Glossary of key verbs used

This table is intended as a guide to the way these verbs have been used.

Verb	Meaning
Analyse	Examine information/data/systems in order to identify problems, issues and themes and their potential implications; assumes that this will inform solutions or further actions.
Apply	Put pre-defined activities into practice; these will typically be defined in procedures.
As required	Allows for situations where this may not apply or may not always apply. Where it does not apply the outcome of the competency is not diminished. It may also imply that the way this is done in one workplace may be different to the way it is done in another workplace, and that the assessment should allow it to be done 'as required' in that workplace.
Assist	Help others and/or provide specific guidance to help them achieve desired outcomes
Consult	Communicate with relevant stakeholders/experts/ advisers and draw some conclusions from that consultation.
Data	Typically, numbers in a raw form which is not able to be directly used.
Demonstrate	The 'demonstration' may be achieved in various ways, for example, practical activity, presentation of work place documentation, proof of past experience, answering written or verbal questions.
Determine	Define and select based on analysis of information. May or may not require calculation to be done by the individual.
Develop	Conceptualise a process, procedure or system and identify how it can be established; may include problem solving. Develop may mean 'develop from scratch' or 'take existing and improve'.
Ensure	Allows for doing or making sure something is done; requires some follow up/follow through to check that it has been done and respond in some way if it has not.
Establish	Put into practice a new process, procedure or system; includes planning the steps and resources required.
Facilitate	Select and undertake activities with others (including standing or ad hoc teams) that are designed to help/enable them to achieve desired outcomes, facilitate/lead/mentor. Proactive, not just make the conditions to allow it to happen.
Forms	Paper or electronic proforma, checklist, log sheet, etc. that doesn't require much free-form writing but could include dot points and simple sentences/phrases. May be simply about entering data into a provided space.
Identify	Find, select and convey (already existing) information. May be conveyed in a range of ways; for example, verbally, visually, listed in note form, going and pointing.
Implement	Decide how to realise a defined outcome and put it into practice; may include coordinating input from others.
Information	Data that has been compiled, organised or otherwise arranged so that it is in a form which can be readily used.
Interpret	Examine data/information and apply it to a specific situation.
Lead	Provide information and opportunities to others (including standing or ad hoc teams) to enable them to achieve desired outcomes.
Records	Any history of what has occurred, written or electronic. Includes forms, reports, logs, electronic data and the like.
Reports	May be written (paper or electronic) or verbal, using phrases and/or sentences and will have some overall structure and may conform to a general template, but allows

Verb	Meaning
	for variation by the person writing/compiling the report.
Recommend	Should be based on consideration of several options and indicates a preference based on some logic or evidence. The recommendation should be made within actual or typical enterprise procedures.
Review	Examine information/data/systems to check that they meet current requirements.

- END -