Competency Standards for Caribbean Vocational Qualifications (CVQ)

CCFPAG2002 CVQ Level 2 – Aquaculture Grow Out Operations

Unit Code	Unit Title	Mandatory/ Elective
FP00008	Grade live fish	Mandatory
FP00009	Monitor aquaculture production environment and maintain environmental conditions in holding units	Mandatory
FP00010	Transport live fish	Mandatory
FP00011	Implement fish feeding programme	Mandatory
FP00012	Control the aquatic production environment	Mandatory
FP00013	Maintain aquaculture re-circulating system	Mandatory
FP00014	Collect information on fish growth and development	Mandatory
FP00015	Care for juvenile fish	Elective
FP00016	Maintain equipment and machines	Elective
FP00017	Construct new structures and surfaces	Elective
MEMFAB0111A	Perform basic welding using manual metal arc welding process (MMAW)	Elective
MEMMRD0161A	Disconnect and reconnect fixed wired electrical machinery, appliances and fixtures	Elective

To achieve this qualification all mandatory units and a minimum of 2 electives must be achieved.

FP00008 Grade Live Fish

Unit Descriptor:

This unit deals with the skills and knowledge required for grading live fish, as part of routine husbandry. It describes the work expectations associated with preparing to grade live fish and grading live fish.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Prepare to grade live fish	1.1	Wear suitable personal protective equipment when grading fish
		1.2	Carry out work safely, according to the health and safety requirements of the workplace
		1.3	Check that fish have been conditioned for grading, in accordance with industry and workplace procedures
		1.4	Setup grading equipment and areas to grade fish according to grading requirements
2	Grade live fish	2.1	Handle fish during grading in a manner which is safe and minimises stress, according to industry procedures
		2.2	Operate grading equipment in a serviceable condition throughout the grading process, following manufacturer's instructions
		2.3	Observe and report on the performance and outcome of the grading operation and ensure compliance with specifications
		2.4	Re-stock fish in holding unit(s) following grading process according to grading requirements
		2.5	Observe, record and report on the behaviour and health of newly stocked fish, following workplace procedures
		2.6	Recognize and deal with factors that can disrupt the grading process within limits of authority, in accordance with workplace procedures
		2.7	Clean and store fish grading equipment after use, following manufacturer's instructions and workplace procedures
		2.8	Maintain records of grading fish according workplace procedures

RANGE STATEMENT

Personal protective equipment includes:
- gloves
- boots
- safety glasses

Grading equipment includes:
- grading device
- scale
- measuring board
- nets

Factors that can disrupt the grading process include:
- changes in environmental conditions
- malfunction of equipment
- changes in fish behaviour

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the health and safety requirements associated with the grading process
2. What are the advantages and disadvantages of different grading methods
3. What is the importance of accurate grading to the management of healthy fish
4. What is the potential impact of adverse environmental conditions on the grading operation
5. Why are fish graded as part of husbandry programmes
6. How to recognise signs of stress in fish before, during and after grading
7. How grading equipment can damage fish if it is not in a serviceable condition
8. What is the anatomy of fish
9. What is bio-security and how is it maintained during grading
10. What are the equipment and methods used to grade fish on site
11. How to grade fish according to their different characteristics (specification, size, quality and condition)

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:
- setup grading equipment and areas to grade fish
- check that fish have been conditioned for grading
- handle fish in a manner which minimises stress
- re-stock fish in holding unit(s) following grading process
- recognize and deal with factors that can disrupt the grading process within limits of authority

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's

reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials which are deemed necessary.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00009 Monitor Aquaculture Production Environment and Maintain Environmental Conditions in Holding Units

Unit Descriptor: This unit deals with the skills and knowledge required for monitoring the aquatic production environment and maintaining the aquatic environment in holding units for any species of fish. It describes the work expectations associated with monitoring the aquatic production environment, maintaining environmental conditions within holding units and responding to negative conditions within holding units.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Monitor aquatic production environment	1.1	Wear suitable personal protective equipment when working
		1.2	Carry out work safely in line with health and safety requirements
		1.3	Observe, record and report on fish behaviour, signs of stress or disorder which indicate changes in environmental and health conditions, following workplace procedures
		1.4	Monitor environmental conditions within holding units, following workplace procedures
		1.5	Monitor condition of holding units, following workplace procedures
		1.6	Monitor the condition of pest and predator preventive measures and devices, following workplace procedures
		1.7	Monitor farm environment for signs of predation and escape, following workplace procedures
		1.8	Monitor farm environment for signs of theft following workplace procedures
		1.9	Report accurately any suspected escapes and concerns regarding containment, following workplace procedures
		1.10	Maintain records of monitoring, following workplace procedures
2	Maintain environmental conditions within holding units	2.1	Carry out procedures to control discharge from holding units, following workplace procedures
		2.2	Carry out procedures to maintain water exchange within holding units, following workplace procedures
		2.3	Carry out procedures to maintain dissolved oxygen levels and other water quality parameters within holding units, following workplace procedures

3	Respond to negative conditions within holding unit	3.1	Remove and record mortalities from holding units minimising disturbance to remaining fish, according to workplace procedures
		3.2	Report any unusual variations in mortality promptly to the appropriate person, following workplace procedures
		3.3	Dispose of waste according to site waste management procedures
		3.4	Take action to limit impact of adverse weather and environmental conditions, within limits of authority, following workplace procedures
		3.5	Take action to minimise the impact of predators and maintain security of holding units, following workplace procedures
		3.6	Respond to emergencies according to workplace procedures
		3.7	Provide accurate information on actions taken to maintain records of environmental conditions, following workplace procedures

RANGE STATEMENT

Personal protective equipment includes:
- gloves
- boots
- safety glasses

Monitoring aquaculture production environment includes:
- water temperature
- dissolved oxygen levels
- fish behaviour
- chemical and physical properties of the aquatic environment

Environmental conditions include:
- chemical and physical properties of the aquatic environment
- localized weather conditions

Signs of stress/disorder in fish include:
- piping
- erratic swimming behaviour
- reduced feeding response
- lethargic swimming behaviour
- unusual appearance

Pest and predators include:
- birds
- reptiles
- insects
- unwanted fish
- thieves

Pest and predator preventative devices include:
- excluder nets
- scare crows
- fences
- sound devices
- electronic devices
- dogs
- security personnel

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the health and safety requirements associated with the monitoring and maintaining of fish
2. How can changes in environmental conditions affect fish
3. What are the environmental requirements of the different life stages of the fish species being farmed (e.g. pH, ammonia levels, salinity where appropriate)
4. What is normal fish behaviour and what are the signs that indicate stress or disorder
5. How and why is it important to monitor the environmental condition within holding units
6. How can environmental conditions outside holding units affect holding units
7. What is the anatomy of a healthy fish
8. How holding unit and handling equipment design and construction supports containment
9. What are the potential causes of stock escapes
10. How to inspect and test holding units
11. What are the actions to follow if an escape is suspected or identified
12. What are common pests and predators and how are they likely to attack farm stock
13. What are the legal pest and predator preventative measures and devices
14. What are the signs that can indicate potential fish loss and predator activity
15. How the loss of fish can affect the environment and farmed fish production
16. How can the legal implications of fish loss impact on the farm
17. How to implement escape contingency plans
18. How legislation controls water usage on fish farms
19. What are the equipment and methods used to sample and assess environmental conditions
20. Why waste must be disposed of according to recommended procedures
21. What are the actions that can be taken to maintain environmental conditions within holding units
22. What is the relationship between water temperature and dissolved oxygen
23. Why are accurate mortality records essential to the management of a fish farm
24. How variations in mortality can be used to indicate the condition of farm stock
25. What are the emergency procedures and why must they be followed when dealing with an incident
26. What are the site back-up systems, including when and how they are used to maintain environmental conditions and deal with emergencies

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:

- monitor environmental conditions and the condition of pest and predators preventative measures within and around holding units
- carry out procedures to control discharge from holding units
- carry out procedures to maintain water exchange and oxygen levels within holding units
- remove and record mortalities from holding units minimising disturbance to remaining fish
- take action to limit impact of adverse weather and environmental conditions
- take action to minimise the impact of predators and maintain security

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00010 Transport Live Fish

Unit Descriptor: This unit deals with the skills and knowledge required for transporting live fish. It describes the work expectations associated with preparing transportation and holding units for live fish and transporting live fish to specified location.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Prepare transportation for live fish	1.1	Wear suitable personal protective equipment when working
		1.2	Carry out work safely in line with health and safety requirements
		1.3	Obtain transport specification following workplace procedures
		1.4	Check that fish have been conditioned and are in a physical condition suitable for transportation
		1.5	Prepare transport systems to achieve the safe and secure movement of fish, following workplace procedures
2	Prepare holding units for live fish	2.1	Establish safe and un-hindered access to holding units following workplace procedures
		2.2	Prepare holding units into a condition suitable for receiving live fish, following workplace procedures
		2.3	Establish environmental conditions within transport unit to maintain fish health and wellbeing during transport, following workplace procedures
		2.4	Check that the intended destination is ready and suitable to receive fish
3	Transport live fish	3.1	Load fish safely into transport in a manner which avoids escape and minimises stress, following workplace procedures
		3.2	Transport fish efficiently with in a manner which maintains their wellbeing in accordance with industry procedures
		3.3	Maintain environmental conditions within holding units to ensure fish health and welfare is maintained, following industry procedures
		3.4	Observe behaviour of fish for signs of stress during transport, where appropriate
		3.5	Take action to correct difficulties encountered during transport, following workplace procedures

3.6 Observe and report on the condition of transported fish, following workplace procedures

3.7 Provide accurate information and maintain records of fish transport, following workplace procedures

RANGE STATEMENT

Personal protective equipment includes:
- gloves
- boots
- safety glasses

Environmental conditions include:
- water levels
- oxygen levels
- water quality
- temperature

Difficulties to be dealt with during transport:
- stressed fish
- equipment malfunction
- changes in environmental conditions
- time delay

Transportation methods include:
- air
- sea
- land

Signs of stress in fish include:
- piping
- erratic swimming behaviour
- reduced feeding response
- lethargic swimming behaviour
- unusual appearance

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the health and safety requirements associated with the transport of live fish
2. Why does fish need to be conditioned before being transported
3. How to establish the environmental conditions required by fish
4. What is the importance of transporting fish under hygienic conditions
5. Why should only healthy fish be transported
6. What are the behavioural indicators when fish are stressed or have a disorder
7. What are the precautions that are to be followed to reduce the danger of transporting unwanted species with live fish
8. What are the equipment and methods used to transport fish
9. How and why is it important to prepare safe access to holding units
10. How the husbandry risk assessment controls the transport of fish
11. Why it is important to move fish with minimum time delay
12. What is the importance of taking immediate action in the event of difficulties being encountered during transportation
13. Why is it important to monitor the condition of transported fish
14. What are the legal requirements which control the movement of live fish between different locations (e.g. restocking)

15. What are the dangers of transporting non-target species with live fish
16. What are the dangers to bio-security from the movement of fish

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:

- prepare transport systems to achieve the safe and secure movement of fish
- prepare holding units into a condition suitable for receiving live fish
- establish and maintain environmental conditions within transport unit
- load fish safely into transport following workplace procedures
- take action to correct difficulties encountered during transport

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00011 Implement Fish Feeding Programme

Unit Descriptor:

This unit deals with the skills and knowledge required for the implementation of feeding regimes to support the production of farmed fish. It describes the work expectations associated with implementing and monitoring a fish feeding regime.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Implement fish feeding regime	1.1	Wear suitable personal protective equipment when working
		1.2	Carry out work safely in line with health and safety requirements
		1.3	Implement daily feeding regimes to take account of environmental variations, following supervisor's instructions
		1.4	Check that feeding regimes are followed through the accurate implementation of feeding procedures
2	Monitor fish feeding regime	2.1	Implement adjustments to feeding regimes to take account of fluctuations according to supervisor's instructions
		2.2	Control specialist feeding regimes to support specified production requirements following supervisor's instructions
		2.3	Observe, record and report changes in feeding behaviour and take corrective action in accordance with supervisor's instructions
		2.4	Monitor the effective operation of feeders, feeding systems and monitoring equipment, following workplace procedures
		2.5	Maintain the effective storage of feed, following workplace procedures and manufacturer's instructions
		2.6	Rectify causes of waste from feeding regimes, following supervisor's instructions
		2.7	Maintain accurate records in support of all feeding activities, events and feed storage, following workplace procedures

RANGE STATEMENT

Personal protective equipment includes:

- gloves
- boots
- safety glasses
- dust mask

Environmental variations include:

- rainfall
- temperature
- cloud cover

Feeding procedures include:
- frequency
- quantity

Feed includes:
- live feed
- prepared rations of various sizes and formulations

Equipment includes:
- mechanized feeders
- automatic feeders
- demand feeders
- scales
- water quality monitoring equipment

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are feeding rates and how do they fluctuate with environmental conditions
2. What is the importance of good record keeping to the management of feeding regimes
3. What are specialist feeding regimes and their application in the maintenance of fish health and development
4. What is normal feeding behaviour and how to determine likely cause of changes in this behaviour
5. Why is it important to investigate variations in feeding behaviour
6. Why is important to modify feeding specifications to take account of variations in environmental conditions
7. What are the operating requirements of feeding, feeding systems and monitoring devices
8. What systems are used to collect, store and analyse feeding records
9. What are the various feed types and diets and how they are selected to ensure production targets are achieved
10. What are the effective feed storage methods, including feed record reconciliation
11. How visual observations are used to help regulate the feeding process and how others can support the collection of this data
12. How to minimise feed waste and why it should be minimised

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:
- implement daily feeding regimes according to supervisor's instructions
- implement adjustments to feeding according to supervisor's instructions
- observe, record and report changes in feeding behaviour and take corrective action in accordance with supervisor's instructions

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00012 Control the Aquatic Production Environment

Unit Descriptor:

This unit deals with the skills and knowledge required for controlling the environmental conditions of the aquatic production environment for any farmed fish or shellfish. It describes the work expectations associated with maintaining the aquatic production environment and implement controls for the aquatic production environment.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Maintain aquatic production environment	1.1	Wear suitable personal protective equipment when working
		1.2	Check that equipment, alarms and security systems are maintained in a serviceable condition
		1.3	Facilitate the regular collection of information about the aquatic production environment
		1.4	Maintain accurate records in respect of the production environment
		1.5	Maintain site bio-security in accordance with site biological risk assessments
		1.6	Control the disposal of waste to maintain the aquatic environment, in accordance with legal requirements and industry guidelines
2	Implement controls for aquatic production environment	2.1	Modify production programmes to take account of prevailing environmental conditions, according to supervisor's instructions
		2,2	Implement grading programmes to maintain required stocking densities within holding units, following workplace procedures
		2.3	Implement and control environmental maintenance programmes to meet organisational requirements, in accordance with current legislation and industry practices
		2.4	Implement emergency procedures to deal with identified emergencies affecting the aquatic environment, following workplace procedures
		2.5	Support others to effectively implement environmental maintenance programmes, following workplace procedures

RANGE STATEMENT

Personal protective equipment includes:

- gloves
- boots
- safety glasses

Information on aquatic environment include:

- physical water quality parameters (eg. water temperature, pH)
- chemical water quality parameters (eg. ammonia, nitrite, nitrate)
- stocking density
- pest/predator data

Equipment includes:

- pumps
- aerators
- sensors
- water quality testing equipment

Holding units includes:

- cages
- ponds
- raceways
- tanks

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the holding unit characteristics and stocking capabilities
2. What are the environmental requirements of the fish species being farmed and how organisational procedures relate to the codes of good practice and the law
3. How to establish optimum stocking densities for the holding units, in respect of the fish being farmed
4. What are the welfare requirements for fish and how are these maintained within the available holding units
5. How environmental factors can affect fish welfare
6. How appropriate environmental maintenance programmes help to maintain water quality
7. How to implement and maintain the environmental maintenance programmes covering: care of holding units, containment and farm security, control of stocking densities, control of pests and predators, disposal of waste, control of farm effluent, bio-security
8. How to determine farm characteristics in terms of water quality, temperature and oxygen content
9. How fish behaviour is used as an indicator for changes in environmental conditions
10. How to properly dispose of waste including discharge consents and how are these controlled by the regulatory bodies
11. What are the environmental conditions which optimise stock performance
12. What are the pest and predator recognition and legal methods of exclusion and control
13. What are the reasons for keeping environmental records, and the importance of their accuracy
14. What are the causes of fish escape and remedial actions necessary
15. What are the procedures used to deal with environmental emergencies: pollution incidents, equipment failure, variations in water quality
16. What is bio-security and its importance in maintaining fish health and minimising environmental impact
17. What is the site equipment design and setup and its associated strengths and weaknesses as a fish containment system
18. What are the procedures used to monitor the condition of site equipment

19. What is the current legislative framework or code of best practice and implications following a breach of containment

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:

- implement and control environmental maintenance programmes to meet organisational requirements
- modify production programmes to take account of prevailing environmental conditions
- implement grading programmes to maintain required stocking densities within holding units
- implement emergency procedures to deal with identified emergencies affecting the aquatic environment
- control the disposal of waste to maintain the aquatic environment
- maintain site bio-security in accordance with site biological risk assessments

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00013 Maintain aquaculture re-circulating system

Unit Descriptor:

This unit deals with the skills and knowledge required for maintaining an aquaculture re-circulating system, so that it is capable of supporting an enclosed aquatic production environment. It describes the work expectations associated with monitoring the aquaculture re-circulating system and dealing with irregularities.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Monitor aquaculture re-circulating system	1.1	Wear suitable personal protective equipment when working
		1.2	Obtain water quality parameters specification for recirculation system
		1.3	Monitor and maintain water flow/circulation within holding units, following workplace procedures
		1.4	Monitor the condition of the water filtering and purification equipment in accordance with supervisor's instructions
		1.5	Collect and record data to determine water quality parameters, following workplace procedures
		1.6	Compare obtained data with specification to identify any irregularities
2	Deal with irregularities	2.1	Investigate cause of any irregularity within limits of authority, following workplace procedures
		2.2	Take action to limit impact of irregularities within limits of authority and following workplace procedures
		2.3	Deal with system emergencies within limits of authority, following workplace procedures
		2.4	Seek specialist advice when irregularities falls outside limits of authority
		2.5	Complete system component maintenance according to specified maintenance procedures and schedules
		2.6	Dispose of waste according to site waste management procedures
		2.7	Provide accurate records following workplace procedures

RANGE STATEMENT

Personal protective equipment includes:

- boots
- coveralls
- gloves

Water quality parameters include:

- ammonia levels
- nitrate levels
- oxygen levels

- eye protection

- alkalinity
- pH
- salinity
- temperature

Water filtering and purification equipment include:

- settling chambers
- clarifiers
- bio-filters
- bead filters
- ozone equipment

Maintenance of system components include:

- filtration
- pumping
- sterilisation units
- pipework
- alarm systems

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the health, safety and bio-security requirements associated with recirculation systems
2. Why is it important to maintain environmental conditions within recirculation systems
3. What environmental conditions are required by the species being farmed
4. Why waste must be disposed of according to recommended procedures
5. What actions can be taken to maintain water quality parameters within the desired system parameters
6. How legislation affects water usage and discharge
7. What are the component parts of the recirculation system
8. How the different system components support water purification
9. Why accurate records are essential to the management of the system
10. What are the water quality requirements relevant to species being farmed
11. How can irregularities in water quality parameters impact on the health and wellbeing of farmed species
12. What are the limits of authority in respect to the system
13. What are the emergencies that can impact on recirculation systems
14. What are the site backup systems, including when and how they are used to maintain environmental conditions and deal with emergencies
15. What is the importance of maintenance schedules for system components to maintain water quality parameters

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:

- monitor and maintain water flow/circulation within holding units
- monitor the condition of the water filtering and purification equipment in accordance with manufacturer's instructions
- compare obtained data with specification to identify any irregularities

- take action to limit impact of irregularities within limits of authority and following workplace procedures
- deal with system emergencies within limits of authority, following workplace procedures
- complete system component maintenance according to specified maintenance procedures and schedules

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00014 Collect Information on Fish Growth and Development

Unit Descriptor:

This unit deals with the skills and knowledge required for monitoring the growth of fish. It describes the work expectations associated with preparing equipment for weighing and measuring fish.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Prepare equipment for weighing and measuring fish	1.1	Wear suitable personal protective equipment when working
		1.2	Carry out work safely in line with health and safety requirements
		1.3	Prepare weighing and measuring equipment to collect accurate information about fish growth, following workplace procedures
		1.4	Obtain representative samples of fish from holding units while minimising the disturbance caused to remaining fish
		1.5	Maintain measuring equipment in a serviceable condition throughout the sampling process
2	Measure fish growth	2.1	Use measuring equipment to determine growth and development of fish, following manufacturer's instructions
		2.2	Prepare and handle fish in a manner which minimises stress, following industry procedures
		2.3	Clean and store fish measuring equipment after use, following workplace procedures
		2.4	Provide accurate information to maintain records of fish growth, following workplace procedures

RANGE STATEMENT

Personal protective equipment includes:

- gloves
- boots
- safety glasses

Weighing and measuring equipment includes:

- scales
- measuring board
- calipers
- nets

Information on fish to be collected includes:

- weight gain
- changes in length
- physical characteristics

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the health and safety requirements associated with the sampling process
2. What is the importance of accurate growth measurement to fish production
3. How can anaesthetics be used to assist the collection of accurate data and to minimise the stress caused to fish
4. What are the standard measurements which are commonly used to specify the size of individual fish
5. What is the importance of maintaining equipment into a serviceable condition including calibration
6. How to collect representative samples of fish
7. How fish quality is assessed and scored
8. How assessments are used to determine production performance
9. What is the importance of fish anatomy
10. What are the equipment and methods used to sample and assess fish

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:

- prepare weighing and measuring equipment to collect accurate information about fish growth
- maintain measuring equipment in a serviceable condition throughout the sampling process
- use measuring equipment to determine growth and development of fish, following manufacturer's instructions and workplace procedures
- prepare and handle fish in a manner which minimises stress, following industry procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00015 Care for Juvenile Fish

Unit Descriptor: This unit deals with the skills and knowledge required for caring for juvenile fish. It describes the work expectations associated with maintaining conditions in hatchery and maintaining the wellbeing of juvenile fish.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Maintain conditions in hatchery	1.1	Wear suitable personal protective gear when working
		1.2	Maintain environmental conditions and bio-security within the hatchery holding units following workplace standards
		1.3	Observe and report on hatching process in accordance with workplace procedures
		1.4	
		1.5	Monitor and report on water temperature within hatchery holding units, following workplace procedures
		1.6	Carry out quarantine and acclimatization practices according to workplace procedures
2	Maintain well being of juvenile fish	2.1	Feed fish according to workplace schedule or in response to signs which indicate readiness for feeding
		2.2	Remove dead fish and debris from holding units, keeping disturbance of remaining fish to a minimum, following workplace procedures
		2.3	Carry out routine grading of juvenile fish according to workplace procedures
		2.4	Provide accurate information to maintain records of hatchery activities following workplace procedures

RANGE STATEMENT

Personal protective gear includes:
- gloves
- safety goggles
- protective footwear

Environmental conditions include:
- water quality parameters
- bio-security

Fish feed includes:
- starter feeds
- live feed

Signs indicating readiness for feeding include:
- pattern of movement of juvenile fish
- behaviour of juvenile fish
- consumption of feed from previous feeding

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the health and safety requirements associated with fish hatchery work
2. What are the signs which indicate readiness for first feeding
3. What are the feeding requirements for juvenile fish
4. What is the importance of hygiene and bio-security within hatchery
5. What are the common health problems and disorders associated with hatcheries and the signs which identify their presence
6. What is the importance of removing dead and dying fish from hatcheries
7. What are the requirements controlling the disposal of mortalities and waste

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:
- maintain environmental conditions within the hatchery holding units
- feed fish according to workplace schedule or in response to signs which indicate readiness for feeding

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an

appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00016 Maintain Equipment and Machines

Unit Descriptor: This unit deals with the skills and knowledge required for maintaining equipment and machines. It describes the work expectations associated with preparing equipment and machines for maintenance and carrying out maintenance procedures.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Prepare equipment and machines for maintenance	1.1	Wear suitable personal protective equipment when working
		1.2	Identify the equipment and machines requiring maintenance according to supervisor's instructions
		1.3	Check that the equipment and machines requiring maintenance are safe and completely isolated from the power source
		1.4	Take correct precautions to minimise dangers from contamination and hazardous chemicals, following workplace procedures
		1.5	Keep the work area safe and in a condition suitable for maintenance according to workplace procedures
		1.6	Obtain and prepare tools and materials suitable for the maintenance procedure, following manufacturer's instructions
		1.7	Complete the preparation of equipment and machines for maintenance in accordance with supervisor's instructions
2	Carry out maintenance procedures	2.1	Maintain equipment and machines in accordance with manufacturers' instructions and standard procedures
		2.2	Maintain health and safety in accordance with relevant legislation and codes of practice
		2.3	Minimise the escape of substances and dispose of waste in a safe manner and place, according to workplace procedures
		2.4	Refer problems to the appropriate person following workplace procedures
		2.5	Clean, service and store tools after use, following manufacturer's instructions and workplace procedures

RANGE STATEMENT

Personal protective equipment includes:
- safety goggles
- gloves
- safety boots

Equipment and machines requiring maintenance include:
- water pumps
- blowers
- aerators
- generators
- scales

Tools used for carrying out maintenance:
- hand tools
- power tools

Health and safety considerations include:
- safe use of hand and power tools
- use of hazardous substances
- disposal of waste product

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the equipment/machinery that requires routine maintenance
2. What are the methods for preparing equipment and machines
3. What are the health and safety requirements in relation to the preparation and maintenance of equipment and machines
4. What are the hazardous chemicals and substances which may be present and ways in which they should be dealt with
5. What are the type of tools, equipment and materials required for the maintenance procedure
6. What are the types of protective clothing and the reasons why they must be worn
7. What are the correct ways of wearing personal protective equipment
8. What are the organisational health and safety policy and your specific responsibilities under health and safety legislation
9. What are the methods for maintaining equipment and machines
10. What are the reasons for maintaining equipment and machinery and the possible consequences of not maintaining
11. What are the requirements relating to the maintenance of equipment and machinery
12. What are the correct methods for disposing of waste materials
13. What are the levels of responsibility in relation to the maintenance of equipment and machinery and to whom to go for advice
14. What are the safe and suitable methods of storing tools, equipment and machinery
15. What are the procedures for the safe use of hand and power tools

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:

- obtain and prepare tools and materials suitable for the maintenance procedure, following manufacturer's instructions
- complete the preparation of equipment and machines for maintenance in accordance with instructions
- take the correct precautions to minimise dangers from contamination and hazardous chemicals, following workplace procedures
- maintain equipment and machines in accordance with manufacturers' instructions and standard procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

FP00017 Construct New Structures and Surfaces

Unit Descriptor: This unit deals with the skills and knowledge required for constructing new structures and surfaces. It also describes the work expectations associated with preparing for the construction of new structures and surfaces.

ELEMENTS Candidates must be able to:		PERFORMANCE CRITERIA	
1	Prepare for the construction of new structures and surfaces	1.1	Wear suitable personal protective equipment when working
		1.2	Identify and prepare the necessary tools, equipment, materials and resources for the work
		1.3	Check that the preparation of structures and surfaces is consistent with the specification
		1.4	Prepare the site in a manner appropriate for the structure or surface, which minimises the effect on the surrounding environment
		1.5	Maintain health and safety during the work consistent with relevant legislation and codes of practice
		1.6	Check that working methods allow for waste to be disposed of safely following industry procedures
2	Construct new structures and surfaces	2.1	Check that the foundations of the structure or surface are secure and appropriate to the expected use and the context in which it is set
		2.2	Construct the structure or surface in accordance with specifications
		2.3	Use and maintain tools and equipment safely following manufacturer's specifications
		2.4	Work in a manner that causes minimal disturbance to the site's environment
		2.5	Take the appropriate action if problems arise during work, following workplace procedures
		2.6	Check that the structure or surface meet the specification and is fit for purpose on completion of the work
		2.7	Clear site of unwanted materials and store or dispose according to workplace procedures

RANGE STATEMENT

Personal protective equipment includes:
- headgear
- eye protector
- ear protector
- respirator
- dust mask
- gloves
- safety boots

Tools include:
- hand tools
- power tools

Structures may be permanent or temporary include:
- open drains
- drainage systems
- boundaries
- ponds and tanks

Surfaces include:
- standing areas
- container beds
- pathways
- foundation work

Site preparation includes:
- Identification
- Clearing
- layout
- Back filling
- Grading/levelling
- Compacting
- Installation of formwork

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. What are the purposes that the structures and surfaces are designed to meet
2. What are the equipment and materials that are used to construct the structures or surfaces and how to assess their suitability
3. What are the methods of preparing, checking and adjusting, servicing, cleaning and storing the equipment and materials which are being used
4. How to interpret specifications and the importance of following the specification
5. What are the preparation methods for different structures and surfaces and how these are related to timing and scheduling
6. What are the potential causes of damage to the environment and ways of preventing or minimising them
7. What are the organisational health and safety policy and specific responsibilities under health and safety legislation in relation to this work
8. What are the specific responsibilities under environmental and conservation legislation
9. What are the potential conflicts between constructing structures and surfaces and conserving and protecting the natural environment
10. What are the types of problems which may occur and the actions to take, including remedying the situation or informing others who need to act
11. What are the methods of constructing the structure and/or surface and the relationship of this to its planned use

12. What are the correct handling and use of tools and equipment including their maintenance, transportation and storage
13. How to use materials correctly
14. What working methods/systems promote the health and safety of self and others
15. How to dispose of inorganic and organic waste safely and correctly

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include the ability to:

- prepare the site in a manner appropriate for the structure or surface, which minimises the effect on the surrounding environment
- check that the foundations of the structure or surface are secure and appropriate to the expected use and the context in which it is set
- check that the structure or surface meet the specification and is fit for purpose on completion of the work

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence may be gathered through a variety of ways including direct observation, supervisor's reports, project work, practical demonstration of tasks and functions and oral and written questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to a suitable venue and all materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

MEMFAB0111A: Perform basic welding using manual metal arc welding process (MMAW)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform welding using basic manual arc welding processes and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare materials for welding	1.1	Weld requirements are identified from specifications and/or drawings.
		1.2	Material is correctly prepared using appropriate tools and techniques.
		1.3	Materials are assembled/aligned to specification where required.
2.	Select welding machine settings and electrodes	2.1	Welding machine and electrodes are identified against pre determined welding procedures and specifications and/or technical drawings.
3.	Assemble and set up welding equipment	3.1	Welding equipment is assembled and set up safely and correctly in accordance with standard operating procedures.
		3.2	Test runs undertaken and verified in accordance with specifications.
4.	Identify distortion prevention measures	4.1	Distortion prevention measures are identified.
		4.2	Appropriate action taken to minimise and rectify distortion.
5.	Weld materials by correct process to quality described in General Purpose or equivalent	5.1	Welds are deposited correctly in flat, horizontal and vertical can position and to specifications.
		5.2	Distortion, preventative action taken where required.
		5.3	Joints are cleaned to specifications using correct and appropriate tools and techniques.

6.	Inspect welds	6.1	Weld joints are visually inspected against specifications.
		6.2	Weld defects are identified.
7.	Correct faults	7.1	Defects are removed with minimum loss of sound metal using correct and appropriate techniques and tools.

RANGE STATEMENT

Manual metal arc welding (MMAW) would be carried out using a range of material for heavy or light fabrication.

Materials used may include carbon steel Material:
- low carbon steel plate up to 10 gauge
- low carbon steel plate up to 7mm
- steel and galvanised pipes up to 50mm

Hand tools to include:

- chipping hammer
- ball pein hammer
- wire brushes
- measuring tape
- steel rule
- files
- cold chisels
- tin snips
- centre punch
- scriber
- pliers
- adjustable wrenches
- allen keys
- vice grips
- slip joint pliers
- vice grip clamp
- divider
- compass
- screwdrivers

Protective clothing and equipment:

- safety boots
- coverall
- goggles
- dust mask
- safety helmet
- leggings
- welding helmet

Work activities may include:

- measuring
- marking
- cutting
- filing
- levelling
- hammering
- squaring
- straightening metal

Preparation of materials may include:

- preheating
- setting up of jigs
- fixtures
- clamps etc.

Welding machines:

- AC and DC arc welding plant - electrical and portable engine driven

Joint preparation:

- lap joints
- vee joints
- butt joints
- tee joints

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Weld procedures may include

- amperage setting
- earthing
- electrode flux condition etc.

Machine attachments:

- welding leads
- grounding clamp
- electrode holder

Condition for satisfactory weld:

- pre-heating
- arc strike/travel/length
- electrode angle
- arc dynamic/electrical stability

Welding type may include:

- fillet weld
- lap weld
- butt weld

Welding position may include:

- flat
- vertical up and down horizontal

The person would work under supervision or within a team environment using predetermined standards of quality, safety, work and welding procedures and the skills applied to a range of fabrication activities.

Remedial action using thermal processes may include oxyacetylene and air arc equipment.

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the manual metal arc welding all process or other competencies requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to perform manual arc and/or gas metal arc welding in the flat, horizontal and vertical position and to specifications.
- demonstrate correct procedures in setting up and shutting down manual arc welding equipment
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0141A Follow principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task
- MEMC0R0171A Use graduated measuring devices
- MEMCOR0081A Mark off/out (general engineering
- MEMCOR0091A Draw and interpret sketches and technical drawings
- MEMCOR0191A Use hand tools

Where welding is carried out in the overhead position, then UnitMEMFAB0042A (Perform advanced welding using manual metal arc welding process (MMAW), should also be selected.

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- metal classification
- welding technique
- welding processes
- manual welding equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to perform routine manual arc and/or gas metal arc welding
- manual handling and lifting
- measurement
- drawings, sketches and instructions

Skills
The ability to:

- work safely to instructions
- communicate effectively
- interpret related drawings and instructions
- use power tools and hand tools
- identify/select material
- identify/select welding processes
- handle material, tools and equipment
- measure relative to welding processes
- identify/select materials relative to manual arc and/or gas metal arc welding
- perform manual arc and/or gas metal arc welding

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0161A: Disconnect and reconnect fixed wired electrical machinery, appliances and fixtures

Competency Descriptor: This unit deals with skills and knowledge required to competently disconnect and reconnect fixed wired electrical machinery appliances and fixtures and applies to individuals in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare to disconnect electrical equipment	1.1	Disconnection is planned to ensure OH&S policies and procedures are followed.
		1.2	Appropriate personnel are consulted to ensure work is co-ordinated effectively with others involved in the work site.
		1.3	Electrical characteristics of electrical equipment and electrical supply are determined and recorded in accordance with established procedures.
		1.4	The point of isolation of electrical equipment to be disconnected is determined.
		1.5	Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
2.	Disconnect electrical equipment	2.1	OH&S policies and procedures are followed.
		2.2	Electrical equipment is isolated in accordance with established procedures. (see range statement).
		2.3	Conductor connection sequence is recorded and labelled in accordance with established procedures.
		2.4	Electrical equipment is disconnected from fixed wiring without damage to other components.
		2.5	Disconnected conductors/cables are terminated in accordance with requirements to ensure they are safe and present no potential hazard.

3.	Prepare to reconnect electrical equipment	3.1	Reconnection is planned to ensure OH&S policies and procedures are followed.
		3.2	Appropriate personnel are consulted to ensure work is co-ordinated effectively with others involved in the work site.
		3.4	Replacement electrical equipment is selected on the basis of rating and characteristics being the same as that of the original electrical equipment.
		3.5	Appropriate personnel are consulted in the event that appropriate replacement electrical equipment is not available.
		3.6	Original and/or replacement electrical equipment is tested to ensure it is safe to connect to the electrical supply and use.
		3.7	Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
4.	Reconnect electrical equipment	4.1	OH&S policies and procedures are followed.
		4.2	Measurements are taken to ensure circuit to which electrical equipment is to be connected remains isolated in accordance with established standards.
		4.3	The continuity of protective earthing conductor is tested to determine whether it is sufficiently low.
		4.4	The resistance between the protective earthing conductor and the neutral conductor is tested to determine whether it is sufficiently low.
		4.5	The insulation resistance of active conductors is tested to confirm that it is greater than 1M Ω.
		4.6	An appropriate qualified person is engaged to rectify any non-compliance condition revealed by the testing.
		4.7	Continuity between exposed conductive parts of the electrical equipment and the main earth or metal switchboard enclosure is confirmed.
		4.8	Electrical equipment is connected to comply with requirements.

		4.9	Connections to the electrical equipment are checked to confirm they are correct.
5.	Test the reconnected electrical equipment for safe operation	5.1	OH&S policies and procedures, and established procedures for the reinstatement of isolated circuits and electrical equipment are followed.
		5.2	Arrangements are made with appropriate personnel to test the operation of the electrical equipment.
		5.3	Operational non-conformances are identified and reported in accordance with established procedures.
		5.4	Status report(s) are completed and notified in accordance with established procedures.

RANGE STATEMENT

This unit applies to the disconnecting and reconnecting of fixed wired electrical equipment using engineering principles, tools, equipment and procedures to standard requirements.

The following aspects must be demonstrated:

- prepare to disconnect electrical equipment
- disconnect electrical equipment
- prepare to reconnect electrical equipment
- test the reconnected electrical equipment for safe operation
- provide status reports
- testing to ensure safety, including earth continuity and insulation integrity
- OH&S practice
- determining electrical characteristics of equipment
- identifying point of installation
- isolating equipment
- disconnection techniques
- selecting replacement equipment
- reconnection techniques
- applying techniques, procedures, information and resources relevant to performance

Electrical characteristics refers to:

- voltage
- current rating
- power rating
- direction of rotation
- phase sequence/polarity
- name plates information and duty

Electrical equipment refers to

- composite equipment
- pre-assembled
- control devices
- electrical heaters
- motors
- lighting

EVIDENCE GUIDE

Competency shall be demonstrated in relation to the endorsement for which competency is sought. The following critical aspects of competency shall be demonstrated:

- preparation to disconnect electrical equipment
- disconnecting of electrical equipment
- preparation to reconnect electrical equipment
- reconnection of electrical equipment; and
- testing of the reconnected electrical equipment for safe operation

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit across a representative range of specified electrical equipment in the scope of work and for which endorsement of competency for the specified electrical equipment is being sought; under supervision and to requirements
- To requirements means meeting all relevant safe working practices, manufacturers specifications, codes of practice, regulatory requirements and industry standards
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace for the endorsement sought and scope of work in the Range Statement
- demonstrating an understanding of the underpinning knowledge and skills identified for the scope of work undertaken in the section of this unit titled Underpinning knowledge

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to disconnect and reconnect fixed wired electrical equipment
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures to return equipment to service

(2) Pre-requisite Relationship of Units

- MEMCOR0141A (Follow principles of Occupational Health and safety (OH&S) in work environment)
- MEMCOR0161A (Plan to undertake a routine task)
- MEMCOR0171A (Use graduated measuring devices)
- MEMCOR0091A Draw and interpret sketches and simple drawings)
- MEMCOR0191A (Use hand tools)
- MEMINS0011A (Terminate and connect electrical wiring)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- hazards in the (electrical) work environment: shock hazards; fire hazards; chemical hazards
- hazardous areas
- special situations
- procedures for dealing with fires associated with electrical equipment
- procedures for dealing with related situations
- basic electrical circuit(s): source; control; protection; load
- circuit diagrams: symbols; conventions; interpretations; free sketches
- circuit connections and functions: open circuit; closed circuit; short circuit
- basic electrical measurement: use of multimeters; use of ammeter; use of voltage measuring and indicating devices; testing of measuring instruments; care of measuring instruments; voltage, current and resistance measurement; estimating values of voltage, current and resistance; using ohms law
- fundamental electrical concepts: effects of current; practical resistors; sources of emf; simple practical circuit; series, parallel and series-parallel circuits; electrical measurement; capacitors; inductors; magnetism
- insulation resistance measurement and requirements
- earthing principles and systems
- methods for testing insulation resistance; continuity of prospective earthing conductor; continuity between exposed conductive parts and the earthing system

Knowledge
Knowledge of: (cont'd)

- cable types and conductor termination methods and techniques: conductors solid, stranded and flexible; colour codes
- single and three phase systems and loads: number of active and live conductors required; line and phase voltage; typical loads
- general appliances: appliance identification; appliance ratings
- single and three phase induction motors: motor identification; motor ratings; direction of rotation
- single and three phase heaters: types of heaters; heater identification; heater ratings
- electrical distribution arrangement: power systems; within a premises; purpose of switchboards/distribution boards (residual current devices)
- circuit isolation and protection devices
- isolation procedures: work clearance; testing for voltage; lock-off and tagging; techniques, regulation, codes of practice and procedures
- disconnection procedures, practices and requirements
- replacement equipment
- reconnection procedures, practices and requirements

Skills

The ability to:
- work safely to instructions
- use tools and plant
- use of ladders and elevated work platforms
- ensuring equipment is safe to connect to supply
- return equipment to service

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication,

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be demonstrated by an individual working under supervision or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.