



TECHNICAL &  
VOCATIONAL  
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TRAINING  
AUTHORITY



# National Competency Standard for Water Supply System Operations and Maintenance

**Standard Code: xxxxxxxx**

*[Endorsed by the MALDIVES QUALIFICATIONS AUTHORITY (MQA)]*



## **Standard Development Process**

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To begin with, Water Supply System Operations and Maintenance occupations were profiled through study of the occupation across Maldivian workplaces. During the study, utility enterprises and their relevant occupations were reviewed and the job descriptions were further studied. In addition to that, current trends of occupations internationally were also reviewed. These processes led to the development of the Draft Occupational Standard.

Referred draft occupational standard will be submitted through the TVETA to a team of Technical Panel (TP) selected from the Maldivian workplaces. Members of the TP will provide technical support by recommending changes to the Water Supply System Operations and Maintenance Standard through incorporation of units of competencies and editing of the already included competency units. Purpose of this process is to develop a standard that reflects current work practices of Water Supply System Operations and Maintenance personnel across the various industry sectors of the Maldives. Technical Panel meetings will continue in reviewing the Standard until the Final Draft is drawn which is agreed and accepted by all the participating members.

Final Draft of Water Supply System Operations and Maintenance Standard approved by the TP will then be submitted to the Construction Employment Sector Council for endorsement and validation. A brief report on how the National Occupational Standard of Water Supply System Operations and Maintenance reflecting the process of compilation will be presented to the Construction Employment Sector Council together with the standard. Council members will further review and if Construction ESC recommends any change, MIT is required to bring those changes and once agreeable, Water Supply System Operations and Maintenance Standard will be endorsed by the Council.

With the endorsement from the Construction Employment Sector Council, final document of the National Occupational Standard of Water Supply System Operations and Maintenance will be submitted to the Maldives Qualification Authority (MQA) for final approval. With approval from MQA, the National Occupational Standard of Water Supply System Operations and Maintenance will be published on TVETA website, to be used by training providers in delivering Water Supply System Operations and Maintenance programs across the Maldives.

## **Description of “Water Supply System Operations and Maintenance”**

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Water operators play an important role within the Public Utility Sector of the Maldives as they undertake testing of treated water by the different utility providers. Referred occupations is vital to ensure water produced by the various public and private utility enterprises remained to be of highest quality and pass the standards set by the Environment Protection Agency (EPA) of the Maldives. National Certificate-3 in “Water Supply System Operations and Maintenance” are mapped and organized in such a way to ensure those competent in the referred qualification will have the knowledge and skills to contribute positively to the local construction industry.

## **Prospective Job opportunities**

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Upon successful completion of the National certificate-3 in for Water Supply System Operations and Maintenance students can work in the following jobs.

- Plant Operators
- Assistant Maintenance Technician

## KEY FOR CODING

### Coding Competency Standards and Related Materials

DESCRIPTION	REPRESENTED BY
Industry Sector as per ESC (Three letters)	Construction Sector (CON) Fisheries and Agriculture (FNA) Information, Communication and Technology (ICT) Transport Sector (TRN) Tourism Sector (TOU) Social Sector (SOC) Foundation (FOU)
Competency Standard	S
Occupation with in an industry sector	Two digits 01-99
Unit	U
Common Competency	CR
Core Competency	CM
Optional / Elective Competency	OP
Assessment Resources Materials	A
Learning Resources Materials	L
Curricular	C
Qualification	Q1, Q2 etc.
MNQF level of qualification	L1, L2, L3, L4 etc.
Version Number	V1, V2 etc.
Year of Last Review of standard, qualification	By "/" followed by two digits responding to the year of last review, example /20 for the year 2020

## 1. Endorsement Application for Qualification 01

### 2. NATIONAL CERTIFICATE III IN WATER SYSTEM OPERATION AND MAINTENANCE

**3. Qualification code:**

**Total Number of Credits: 57**

#### 4. Purpose of the qualification

The Certificate III in Water System Operation and Maintenance is to train and empower water plant operators to effectively manage and operate in water plant be installed and operated across various islands in the Maldives.

#### 5. Regulations for the qualification

#### 6. Schedule of Units

Unit No	Unit Title	Code
<b>Common Competencies</b>		
01	Apply Occupational Health and Safety Requirements	
02	Apply work ethics and optimize professionalism	
03	Practice effective workplace communication	
04	Provide effective customer care	
05	Perform computer operations	
06	Provide first aid	
07	Respond to fire	
<b>Core Competencies</b>		
08	Apply Science and Engineering Measurements	
09	Perform Workshop Practice	
10	Apply industrial electrical knowledge and skills	
11	Operate chemical separation equipment	
13	Operate and maintain water Treatment Plant	
14	Monitor systems and equipment	
15	Collect samples and perform basic water tests	
16	Monitor and operate power generation system	
17	Trouble shooting of control systems	
<b>7. Accreditation requirements</b>		
<b>8. Recommended sequencing of units</b>		

## Units Details

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#	Unit Title	Code	Level	No of credits
01	Apply Occupational Health and Safety Requirements		III	04
02	Apply work ethics and optimize professionalism		III	03
03	Practice effective workplace communication		III	03
04	Provide effective customer care		III	05
05	Perform computer operations		III	03
06	Provide first aid		III	05
07	Respond to fire		III	03
08	Apply Science and Engineering Measurements		III	04
09	Perform Workshop Practice		III	03
10	Apply industrial electrical knowledge and skills		III	03
11	Operate chemical separation equipment		III	03
13	Operate and maintain water Treatment Plant		III	04
14	Monitor systems and equipment		III	03
15	Collect samples and perform basic water tests		III	04
16	Monitor and operate power generation system		III	04
17	Trouble shooting of control systems		III	03

### **Packaging of National Qualifications:**

National Certificate III in Water Supply System Operations and Maintenance and will be awarded to those who are competent in units 1+2+3+4+5+6+7+8+9+10+11+12+13+14+15+16+17

### **Qualification Code:**

## Competency Standard for Plant operation

<b>UNIT TITLE</b> Apply Occupational Health and Safety Requirements					
<b>DESCRIPTOR</b>	This unit of competency describes the skills and knowledge to clean laboratory work surfaces, clean and store laboratory equipment and monitor laboratory stocks under direct supervision.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	04

<b>ELEMENTS OF COMPETENCIES</b>		<b>PERFORMANCE CRITERIA</b>
1. Clean work preparation areas		1.1. Clean preparation areas using appropriate cleaning agents and equipment according to workplace procedures 1.2. Remove spillages using appropriate agents, personal protective equipment (PPE) and workplace procedures 1.3. Collect and segregate wastes in accordance with workplace procedures, relevant codes and regulations
2. Clean and store equipment		2.1. Collect used equipment, inspect for faults and, where necessary, remove from service 2.2. Use appropriate agents, apparatus and techniques to clean equipment 2.3. Store clean equipment in the designated locations and manner
3. Monitor stocks of materials and equipment		3.1 Perform stock checks and maintain records of usage as directed 3.2 Store labelled stocks for safe and efficient retrieval 3.3 Inform appropriate personnel of impending stock shortages to maintain continuity of supply
4. Maintain a safe work environment		4.1 Participate in OHS activities within scope of responsibilities 4.2 Use established safe work practices and PPE to ensure personal safety and that of other personnel 4.3 Report potential hazards and/or maintenance issues in own work area to designated personnel 4.4 Minimise the generation of waste and environmental impacts 4.5 Dispose of waste in accordance with workplace procedures, relevant codes and regulations
5. Follow incident and emergency response procedures		5.1 Identify incident and emergency situations 5.2 Report and record incident and emergency situations according to workplace procedures 5.3 Follow incident and emergency procedures as appropriate to the nature of emergency using emergency equipment according to workplace procedures
6. Determine Occupational Health and Safety (OH&S) issues relating to immediate work environment		6.1. Occupational Health and Safety issues in the immediate workplace are assessed and action to rectify the problem is taken or reported to supervisor 6.2. Understand the aspects of First aid

	<p>6.3. Understand the aspects of Fire Respond</p> <p>6.4. Workplace and OH&amp;S procedures are followed to ensure safe working environment</p> <p>6.5. Occupational Health and Safety documents are provided to all work stations, this should include a list of personal safety items based on the line of work.</p>
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## RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

### Risk assessment

- ✓ identifying and analyzing the risk, and considering potential consequences in terms of exposure and hazard and likelihood of each
- ✓ assessing the effectiveness of existing controls
- ✓ determining level of risk, comparing with pre-established criteria for tolerance (or as low as reasonably achievable) and ranking of risks requiring control

### Incidents and emergencies

- ✓ workplace injury and accidents
- ✓ biological and chemical spills
- ✓ leakage of radioactivity
- ✓ fire, bomb and security threats

### Tools, equipment and materials required may include:

- ✓ Relevant cleaning equipment and consumables required
- ✓ Safety equipment
- ✓ Workplace safety and maintenance standards

## ASSESSMENT GUIDE

### Forms of assessment

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the competency Standard.

### Critical aspects (for assessment)

As part of the assessment planned for this unit, it is important that work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment.

### Assessment conditions

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

- ✓ use of suitable facilities, equipment and resources, including work preparation areas, stocks, materials and equipment, cleaning, decontamination and/or disinfection agents and equipment and personal protective equipment (PPE) and other safety devices and materials.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be learnt:</p> <ul style="list-style-type: none"> <li>✓ managing the day-to-day running of science teaching laboratories and preparing practical experiments, demonstrations and field trips</li> <li>✓ working with teaching staff and students to assess risks, develop and implement controls and monitor their effectiveness</li> <li>✓ working with teaching staff and students to ensure all practical activities are performed safely (through demonstrations and monitoring of practical activities)</li> <li>✓ developing operational plans, work schedules, job cards and budgets</li> <li>✓ clarifying and designing practical activities and assessing resource needs</li> <li>✓ preparing laboratory experiments and demonstrations on time with the correct materials and equipment</li> <li>✓ managing contingencies and resources within level of responsibility</li> <li>✓ maintaining the laboratory fit for purpose</li> <li>✓ obtaining stocks of materials and equipment using workplace procedures</li> <li>✓ organising quotes and bookings using workplace procedures</li> <li>✓ working effectively with students and staff who may have diverse work styles, cultures and perspectives.</li> </ul>	<p>Skills to be developed:</p> <ul style="list-style-type: none"> <li>✓ principles of risk assessment, risk management and hierarchy of control</li> <li>✓ principles of small scale budgeting, operational planning and efficient resource use</li> <li>✓ scientific terminology and technical details of sampling, testing, equipment and instrumentation used in the education program's practical activities</li> <li>✓ relevant legislation, regulations and codes governing practical activities</li> <li>✓ workplace procedures for the purchase, handling, storage and transport of materials and equipment</li> <li>✓ relevant work health and safety (WHS) and environment requirements.</li> </ul>



<b>UNIT TITLE</b>		<b>Apply work ethics and optimize professionalism</b>			
<b>DESCRIPTOR</b>	This module covers the knowledge, skills and attitudes required in demonstrating proper work values and professionalism while working as a Plant operator. Besides ethical values, knowledge and skills also developed on maintaining integrity at work.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>		<b>PERFORMANCE CRITERIA</b>			
1. Define the purpose of work	1.1	One's unique sense of purpose for working and the whys of work are identified, reflected on and clearly defined for one's development as a person and as a member of society.			
	1.2	Personal mission is in harmony with company's values.			
2. Apply work values/ethics	2.1	Work values/ethics/concepts are identified and classified in accordance with companies' ethical standard guidelines.			
	2.2	Work policies are undertaken in accordance with company's policies, guidelines on work ethical standard.			
	2.3	Resources are used in accordance with company's policies and guidelines.			
	2.4	Punctuality, absence from work, sick, family and annual leave is maintained alignment to the Employment Act of the Maldives			
3. Deal with ethical problems	3.1	Company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behavior are followed.			
	3.2	Work incidents/situations are reported according to company protocol/guidelines.			
	3.3	Resolution and/or referral of ethical problems identified are reported/documented based on standard operating procedure			
4. Maintain integrity of conduct in the workplace	4.1	Personal behavior and relationships with co-workers and/or clients are demonstrated consistent with ethical standards, policy and guidelines.			
	4.2	Work practices are satisfactorily demonstrated and consistent with industry work ethical standards, organizational policy and guidelines.			
	4.3	Instructions to co-workers are provided based on ethical lawful and reasonable directives			
5. Contribute to workplace efficiency and delivery of quality service	5.1	Prioritize work load according to level of responsibility			
	5.2	Advise supervisor if additional resources or			

	<p>support are required to improve performance</p> <p>5.3 Undertake duties in a positive manner to enhance workplace cooperation and efficiency</p> <p>5.4 Monitor and adjust work practices to ensure that quality of outputs is maintained</p> <p>5.5 Identify and report opportunities for improvements in procedures, processes and equipment in work area</p>
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## **RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

### **Tools, equipment and material used in this unit may include:**

For the purpose of delivering the assignment, students need to be familiarized with the following.

- ✓ Employment act of Maldives

## **ASSESSMENT GUIDE**

### **Forms of assessment**

Assessment for the unit needs to be holistic and must include real or simulated workplace activities.

### **Assessment context**

Assessment of this unit must be completed on the job or in a simulated work environment which reflects a range of practices.

### **Critical aspects (for assessment)**

It is critical that the assessment undertaken for this module be holistic and involve the following.

- ✓ Group discussion
- ✓ Role play
- ✓ Self-paced learning
- ✓ Written
- ✓ Demonstration
- ✓ Observation
- ✓ Interviews/questioning

### **Assessment conditions**

Assessment must reflect both events and processes over a period of time.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> <li>✓ Work responsibilities/job functions</li> <li>✓ Company code of conduct/values</li> <li>✓ Concept of work values/ethics</li> <li>✓ Company policies and guidelines</li> <li>✓ Work ethical standard</li> <li>✓ Company's identified ethical problems</li> <li>✓ Work incidents/situation</li> <li>✓ Standard operating procedures</li> <li>✓ Report writing and documentation</li> <li>✓ Fundamental rights at work including gender sensitivity</li> <li>✓ Corporate social responsibilities</li> <li>✓ Human and interpersonal Relations</li> <li>✓ Value Formation</li> <li>✓ Professional Code of Conduct and Ethics</li> </ul>	<ul style="list-style-type: none"> <li>✓ Purpose for working and the why's of work are identified, reflected and linked to self-development</li> <li>✓ Work values/ethics/concepts are identified and classified in accordance with companies' ethical standard</li> <li>✓ Work policies are undertaken in accordance with company's policies.</li> <li>✓ Resources are used in accordance with company's policies and guidelines.</li> <li>✓ Work incidents/situations are reported according to company guidelines</li> <li>✓ Personal behavior and relationships with co-workers and clients are within ethical standard</li> <li>✓ Work practices are satisfactorily demonstrated and consistent.</li> <li>✓ Instructions to co-workers are provided based on ethical lawful and reasonable directives</li> </ul>

<b>UNIT TITLE Practice effective workplace communication</b>					
<b>DESCRIPTOR</b>	This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements. Understanding the prominence of fluently speaking in both English and Dhivehi during operational level. Correspondingly, participate in group meetings and discussion and accordingly handling the documentation related tasks.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from appropriate sources 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information 1.3 Appropriate medium is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and storage of information are used 1.7 Personal interaction is carried out clearly and concisely
2. Speak English and Dhivehi at an operational level	2.1 Workplace interactions with colleagues appropriately made 2.2 Verbal instructions or requests are responded to at an operational level 2.3 Appropriate non-verbal communication used 2.4 Simple requests are made 2.5 Routine procedures are described 2.6 Different forms of expression in English and Dhivehi is identified and used as appropriate
3. Participate in workplace meetings and discussions	3.1 Team meetings are attended on time 3.2 Own opinions are clearly expressed and those of others are listened to without interruption 3.3 Meeting inputs are consistent with the meeting purpose and established protocols 3.4 Workplace interactions are conducted in a courteous manner

	3.5	Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to
	3.6	Meetings outcomes are interpreted and implemented
4. Complete relevant work-related documents	4.1	Range of forms relating to conditions of employment are completed accurately and legibly
	4.2	Workplace data is recorded on standard workplace forms and documents
	4.3	Basic mathematical processes are used for routine calculations
	4.4	Errors in recording information on forms/ documents are identified and properly acted upon
	4.5	Reporting requirements to supervisor are completed according to organizational guidelines
5. Manage workplace calls and messages	5.1.	Operate workplace phones
	5.2.	Attend and manage phone calls
	5.3.	Read and respond to texts and messages
	5.4.	Perform communication in both English and Dhivehi

## RANGE STATEMENT

Appropriate sources:

- ✓ Team members
- ✓ Suppliers
- ✓ Trade personnel
- ✓ Local government
- ✓ Industry bodies

Medium:

- ✓ Memorandum
- ✓ Circular
- ✓ Notice
- ✓ Information discussion
- ✓ Follow-up or verbal instructions
- ✓ Face to face communication

Storage:

- ✓ Manual filing system
- ✓ Computer-based filing system

Forms:

- ✓ Personnel forms, telephone message forms, safety reports

Workplace interactions:

- ✓ Face to face
- ✓ Telephone

- ✓ Electronic and two-way radio
- ✓ Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams

Protocols:

- ✓ Observing meeting
- ✓ Compliance with meeting decisions
- ✓ Obeying meeting instructions.

## **ASSESSMENT GUIDE**

### **Forms of assessment**

Assessment for the unit needs to be continuous and holistic and must include real or simulated workplace activities.

- ✓ Direct Observation
- ✓ Oral interview and written test

### **Assessment context**

Assessment of this unit must be completed on the job or in a simulated work environment which reflects a range of opportunities for communication

### **Critical aspects (for assessment)**

Assessment requires evidence that the candidate:

- ✓ Prepared written communication following standard format of the organization
- ✓ Accessed information using communication equipment
- ✓ Spoken English at a basic operational level
- ✓ Made use of relevant terms as an aid to transfer information effectively
- ✓ Conveyed information effectively adopting the formal or informal communication

### **Assessment conditions**

It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying circumstances.

## **UNDERPINNING KNOWLEDGE AND SKILLS**

<b>UNDERPINNING KNOWLEDGE</b>	<b>UNDERPINNING SKILLS</b>
<ul style="list-style-type: none"> <li>✓ General knowledge of English and Divehi grammar</li> <li>✓ General knowledge of common telephone equipment</li> <li>✓ General knowledge on effective communication</li> <li>✓ Different modes of communication</li> <li>✓ Written communication</li> <li>✓ Organizational policies</li> <li>✓ Communication procedures and systems</li> </ul>	<ul style="list-style-type: none"> <li>✓ Undertake effective customer relation communications</li> <li>✓ Competent in communicating basic with customers</li> <li>✓ Fluency in English and Dhivehi language usage</li> </ul>

<b>UNIT TITLE</b> Provide effective customer care					
<b>DESCRIPTOR</b>	This unit addresses the importance of caring for customers. It is a very important unit related to providing effective customer care and will include greetings, identifying needs of, delivering quality customer care, handling of inquiries, complaints and managing angry customers.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	05

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Greet customers and colleagues	1.1. Customers and colleagues greeted according to standard procedures and social norms 1.2. Sensitivity to cultural and social differences demonstrated
2. Identify and attend to customer needs	2.1. Appropriate interpersonal skills are used to ensure that customer needs are accurately identified 2.2. Customer needs are assessed for urgency so that priority for service delivery can be identified 2.3. Personal limitation in addressing customer needs is identified and where appropriate, assistance is sought from supervisor 2.4. Customers informed correctly 2.5. Personal limitation identified and assistance from proper sources sought when required
3. Deliver service to customers	3.1. Customer needs are promptly attended to in line with organizational procedure 3.2. Appropriate rapport is maintained with customer to enable high quality service delivery 3.3. Opportunity to enhance the quality of service and products are taken wherever possible
4. Handle inquiries	4.1. Customer queries handled promptly and properly 4.2. Personal limitations identified and assistance from proper sources sought when required
5. Handle complaints	5.1. Responsibility for handling complaints taken within limit of responsibility 5.2. Personal limitations identified and assistance from proper sources sought when required 5.3. Operational procedures to handling irate or difficult customers followed correctly 5.4. Details of complaints and comments from customers properly recorded

6. Handle and manage angry customers	6.1 Apply principles related to anger management 6.2 Meet with angry customers and console them accordingly 6.3 Maintain a log book for recording customer service incidents.
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## **RANGE STATEMENT**

Procedures included:

- ✓ Greeting procedure
- ✓ Complaint and comment handling procedure
- ✓ Incidence reporting procedures
- ✓ General knowledge of property
- ✓ Standard operating procedures for service deliveries
- ✓ Non-verbal and verbal communication
- ✓ Dress and accessories
- ✓ Gestures and mannerisms
- ✓ Voice tonality and volume
- ✓ Culturally specific communication customs and practices
- ✓ Cultural and social differences

Includes but are not limited to:

- ✓ Modes of greeting, fare welling and conversation
- ✓ Body language/ use of body gestures
- ✓ Formality of language

Interpersonal skills:

- ✓ Interactive communication
- ✓ Good working attitude
- ✓ Sincerity
- ✓ Pleasant disposition
- ✓ Effective communication skills
- ✓ Customer needs

Customer with limitation may include:

- ✓ Those with a disability
- ✓ Those with special cultural or language needs
- ✓ Unaccompanied children
- ✓ Parents with young children
- ✓ Pregnant women
- ✓ Single women

**Tools, equipment and materials required may include:**

- ✓ Relevant procedure manuals
- ✓ Availability of telephone, printer, computer, internet, etc.
- ✓ Availability of data on projects and services; tariff and rates, promotional activities in place etc.



## ASSESSMENT GUIDE

### Form of assessment

Assessment for the unit needs to be holistic and must include real or simulated workplace activities.

### Assessment context

Assessment of this unit must be completed on the job or in a simulated work environment which reflects a range of practices.

### Critical aspects (for assessment)

It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations. This unit may be assessed in conjunction with all units which form part of the normal job role.

- ✓ Assessment requires evidence that the candidate:
- ✓ Complied with industry practices and procedures
- ✓ Used interactive communication with others
- ✓ Complied with occupational, health and safety practices
- ✓ Promoted public relation among others
- ✓ Complied with service manual standards
- ✓ Demonstrated familiarity with company facilities, products and services
- ✓ Applied company rules and standards
- ✓ Applied telephone ethics
- ✓ Applied correct procedure in using telephone, printer, computer, internet
- ✓ Handled customer complaints
- ✓ Depict effective communication skills

### Assessment conditions

- ✓ Theoretical assessment of this unit must be carried out in an examination room where proper examination rules are followed.
- ✓ Assessment of hygienic work practices must be constantly evaluated.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be developed:</p> <ul style="list-style-type: none"><li>✓ effective customer services principles, including requirements to meet customer service needs and expectations</li><li>✓ workplace products and services</li><li>✓ customer service reporting procedures</li><li>✓ customer service problem-resolution procedures.</li></ul>	<p>Skills to be developed:</p> <ul style="list-style-type: none"><li>✓ promote products and services in a clear and direct manner</li><li>✓ identify customer needs and expectations</li><li>✓ resolve customer concerns and complaints by taking appropriate action, including:<ul style="list-style-type: none"><li>• handling customer needs in a courteous, discreet and sensitive manner</li><li>• addressing customer complaints and escalating where necessary</li></ul></li><li>✓ apply workplace procedures relating to customer feedback, including:<ul style="list-style-type: none"><li>• customer service and continuous improvement processes</li><li>• workplace customer service practices</li></ul></li></ul>

<b>UNIT TITLE</b> Perform computer operations					
<b>DESCRIPTOR</b>	This unit describes the performance outcomes, skills and knowledge required to start up a personal computer or business computer terminal; to correctly navigate the desktop environment; and to use a range of basic functions.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Start computer, system information and features	1.1. Adjust workspace, furniture and equipment to suit user ergonomic requirements 1.2. Ensure work organization meets organizational and occupational health and safety (OHS) requirements for computer operation 1.3. Start computer or log on according to user procedures 1.4. Identify basic functions and features using system information 1.5. Customize desktop configuration, if necessary, with assistance from appropriate persons 1.6. Use help functions as required
2. Organize files using basic directory and folder structures	2.1 Create folders/subfolders with suitable names 2.2 Save files with suitable names in appropriate folders 2.3 Rename and move folders/subfolders and files as required 2.4 Identify folder/subfolder and file attributes 2.5 Move folders/subfolders and files using cut and paste, and drag and drop techniques 2.6 Save folders/subfolders and files to appropriate media where necessary 2.7 Search for folders/subfolders and files using appropriate software tools 2.8 Restore deleted folder/subfolders and files as necessary
3. Print information	3.1 Print information from installed printer 3.2 View progress of print jobs and delete as required 3.3 Change default printer if installed and required
4. Apply web browsing skills	4.1 Introduction to WWW 4.2 Acknowledge to gather relevant information from reliable sources 4.3 Use of search engines 4.4 Basic interaction of browser 4.5 Creating bookmarks in browser

	4.6 Upload and download files 4.7 Navigation of hyperlink
5. Shut down computer	5.1 Close all open applications 5.2 Shut-down computer according to user procedures
6. Basic Microsoft Word and Excel skills	6.1. Ensure data is entered, checked and amended in accordance with organizational and task requirements, to maintain consistency of design and layout 6.2. Format spreadsheet using software functions; to adjust page and cell layout to meet information requirements, in accordance with organizational style and presentation requirements 6.3. Ensure formulae are used and tested to confirm output meets task requirements, in consultation with appropriate personnel as required 6.4. Use manuals, user documentation and online help to overcome problems with spreadsheet design and production 6.5. Format document using appropriate software functions to adjust page layout to meet information requirements, in accordance with organizational style and presentation requirements 6.6. Use system features to identify and manipulate screen display options and controls 6.7. Use manuals, user documentation and online help to overcome problems with document presentation and production

### **RANGE STATEMENT**

This unit covers computer hardware to include personal computers used independently or within networks, related peripherals, such as printers, scanners, keyboard and mouse, and storage media such as disk drives and other forms of storage. Software used must include but not limited to word processing, spreadsheets, database and billing software packages and Internet browsing software.

### **Tools, equipment and materials required may include:**

- ✓ Storage device
- ✓ Different software and hardware
- ✓ Personal computers system
- ✓ Laptop computer
- ✓ Printers
- ✓ Scanner
- ✓ Keyboard
- ✓ Mouse
- ✓ Disk drive /CDs, DVDs, compressed storage device

## ASSESSMENT GUIDE

The assessment guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this occupational standard

### Forms of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- ✓ direct questioning combined with review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate
- ✓ demonstration of techniques
- ✓ oral or written questioning to assess knowledge of computer operations and functions
- ✓ review of shortcuts created
- ✓ review of folders/subfolders created.

### Critical aspects (for assessment)

Evidence of the following is essential:

- ✓ navigation and manipulation of the desktop environment within the range of assigned workplace tasks
- ✓ knowledge of organizational requirements for simple documents and filing conventions
- ✓ application of simple keyboard functions to produce documents with a degree of speed and accuracy relevant to the level of responsibility required.

### Assessment conditions

- ✓ Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.
- ✓ Assessment must include direct observation of tasks.
- ✓ Where assessment of competency includes third-party evidence, individuals must provide evidence
- ✓ Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"><li>✓ Basic ergonomics of keyboard and computer use</li><li>✓ Main types of computers and basic features of different operating systems</li><li>✓ Main parts of a computer</li><li>✓ Storage devices and basic categories of memory</li><li>✓ Relevant software</li><li>✓ General security and computer Viruses</li></ul>	<ul style="list-style-type: none"><li>✓ communication skills to identify lines of communication, to request advice, to effectively question, to follow instructions and to receive feedback</li><li>✓ problem-solving skills to solve routine problems in the workplace, while under direct supervision</li><li>✓ technology skills to use equipment safely while under direction, basic keyboard and mouse skills and procedures relating to logging on and accessing a computer</li><li>✓ basic typing techniques and strategies.</li></ul>

<b>UNIT TITLE</b>		<b>Provide first aid</b>			
<b>DESCRIPTOR</b>	This unit deals with the skills and knowledge required for the provision of essential first aid in recognizing and responding to emergency using basic life support measures. The person providing first aid is not expected to deal with complex casualties or incidents, but to provide an initial response where first aid is required.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	05

<b>ELEMENTS OF COMPETENCIES</b>		<b>PERFORMANCE CRITERIA</b>			
1.	Assess the situation	1.1.	Physical hazards and risks to self and others' health and safety identified		
		1.2.	Immediate risks to self and casualty's health and safety minimized by controlling hazards in accordance with occupational health and safety requirements		
		1.3.	The situation assessed and prompt decision taken on actions required		
		1.4.	Assistance sought from relevant persons/authority, as required and at the appropriate time		
2.	Apply basic first aid techniques	2.1.	Casualty's physical condition assessed by visible vital signs		
		2.2.	First aid provided to stabilize the patient's physical and mental condition in accordance with enterprise policy on provision of first aid and recognized first aid procedures		
		2.3.	Available first aid equipment used as appropriate		
3.	Monitor the situation	3.1.	Back-up services appropriate to the situation identified and notified promptly		
		3.2.	Information about the patient's condition reported accurately and clearly to emergency services personnel or health professionals		
4.	Prepare documentation required	4.1.	Documented emergency situations according to enterprise procedures		
		4.2.	Clear and accurate reports are provided within required time frames		

## **RANGE STATEMENT**

This unit applies to all tourism and hospitality sectors. The following explanations identify how this unit may be applied in different workplaces, sectors and circumstances. First aid treatment is that defined in Common Law as emergency assistance provided to a second party in the immediate absence of medical or paramedical care.

Established first aid principles include:

- ✓ Checking and maintaining the casualty's airway, breathing and circulation
- ✓ Checking the site for danger to self, casualty and others, and minimizing the danger.

Physical and personal hazards may include:

- ✓ Workplace hazards such as fire, floods, violent persons
- ✓ Environmental hazards such as electrical faults, chemical spills, fires, slippery surfaces, floods, wild animals, fumes,
- ✓ Proximity of other people
- ✓ Hazards associated with the casualty management processes

Risks may include:

- ✓ Worksite equipment, machinery and substances
- ✓ Bodily fluids
- ✓ Risk of further injury to the casualty
- ✓ Risks associated with the proximity of other workers and bystanders

First aid management will need to account for:

- ✓ Location and nature of the work environment
- ✓ Environmental conditions and situations, such as electricity, biological risks, weather and terrain, motor vehicle accidents,
- ✓ The level of knowledge, skills, training and experience of the person administering first aid
- ✓ Familiarity with particular injuries
- ✓ Legal issues that affect the provision of first aid in different industry sectors
- ✓ The characteristics of the site where the injury occurs
- ✓ The nature of the injury and its cause
- ✓ Infection control procedures
- ✓ Availability of first aid equipment, medications and kits or other suitable alternative aids
- ✓ Proximity and availability of trained paramedical and medical/health professional assistance
- ✓ The patient's cardio-vascular condition as indicated by vital signs such as body temperature, pulse rate and breathing rates
- ✓ Unresolved dangers such as fire, chemical contamination or fume toxicity of the area where the injury occurs

Vital signs include:

- ✓ Breathing
- ✓ Circulation
- ✓ Consciousness

Injuries may include:

- ✓ Abdominal trauma
- ✓ Allergic reactions
- ✓ Bleeding
- ✓ Chemical contamination
- ✓ Choking
- ✓ Cold injuries

- ✓ Cardio-vascular failure
- ✓ Dislocations and fractures
- ✓ Drowning
- ✓ Poisoning and toxic substances
- ✓ Medical conditions including epilepsy, diabetes, asthma
- ✓ Eye injuries
- ✓ Head injuries
- ✓ Minor skin injuries
- ✓ Neck and spinal injuries
- ✓ Needle stick injuries
- ✓ Puncture wounds and cuts
- ✓ Crush injuries
- ✓ Shock
- ✓ Smoke inhalation
- ✓ Sprains and strains
- ✓ Substance abuse
- ✓ Unconsciousness
- ✓ Infections
- ✓ Inhalation of toxic fumes and airborne dusts
- ✓ Bone and joint injuries
- ✓ Eye injuries
- ✓ Burns and scalds, thermal, chemical, friction and electrical

Injuries may involve:

- ✓ Unconsciousness
- ✓ Confusion
- ✓ Tremors
- ✓ Rigidity
- ✓ Numbness
- ✓ Inability to move body parts
- ✓ Pain
- ✓ Delirium
- ✓ External bleeding
- ✓ Internal bleeding
- ✓ Heat exhaustion
- ✓ Hypothermia
- ✓ Pre-existing illness

Appropriate persons/authority from whom assistance may be sought may include:

- ✓ Emergency services personnel
- ✓ Health professionals
- ✓ Colleagues
- ✓ Customers
- ✓ Passers by

Assistance may include, as appropriate to emergency situations:

- ✓ Maintaining site safety and minimizing the risk of further injury or injury to others
- ✓ Making the casualty comfortable and ensuring maximum safety
- ✓ Assessment of injury situations
- ✓ Providing first aid including managing bleeding through the application of tourniquets, pressure and dressings
- ✓ Giving CPR and mouth-to-mouth resuscitation
- ✓ Giving reassurance and comfort
- ✓ Raising the alarm with emergency services or health professionals
- ✓ Removing debris

## Tools, equipment and material used in this unit may include:

- ✓ First aid kit
- ✓ Pressure and other bandages
- ✓ Thermometers
- ✓ Eyewash
- ✓ Pocket face masks
- ✓ Rubber gloves
- ✓ Dressings
- ✓ Flags and flares
- ✓ Fire extinguishers
- ✓ Communication equipment such as mobile phones

## ASSESSMENT GUIDE

### Forms of assessment

Assessment methods must be chosen to ensure that application of accepted first aid techniques can be practically demonstrated. Methods must include assessment of knowledge as well as assessment of practical skills.

The following examples are appropriate for this unit:

- ✓ Practical demonstration of the use of commonly-used equipment and first aid supplies
- ✓ Explanation about management of a variety of common simulated injury situations
- ✓ Questions to test knowledge of injury situations, types of injury and management of injury situations
- ✓ Review of portfolios of evidence and third-party reports of performance of first aid by the candidate

### Assessment context

This unit may be assessed in a simulated environment

### Critical aspects (for assessment)

Assessment must ensure:

- ✓ Use of real first aid equipment
- ✓ Ability to assess situations requiring first aid and to decide on a plan of action including seeking help
- ✓ Ability to apply established first aid principles including:
  - Checking and maintaining the casualty's airway, breathing and circulation
  - Checking the site for danger to self, casualty and others and minimizing the danger

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"><li>✓ Basic anatomy and physiology</li><li>✓ Resuscitation</li><li>✓ Bleeding control</li><li>✓ Care of the unconscious</li><li>✓ Airway management</li><li>✓ Basic infection control principles and procedures</li><li>✓ Legal requirements</li><li>✓ Duty of care</li><li>✓ Reporting requirements</li></ul>	<ul style="list-style-type: none"><li>✓ Assertiveness skills</li><li>✓ Communication skills</li><li>✓ Decision making</li><li>✓ Report preparation</li><li>✓ Provide first aid</li><li>✓ Provide various types of treatments</li><li>✓ Demonstrate the four-step process providing basic first aid</li></ul>



<b>UNIT TITLE</b>		<b>Respond to Fire</b>			
<b>DESCRIPTOR</b>	This unit covers the competency required to carry out initial response to suppress a fire. It also includes the ability to identify the nature and classification of the fire, report the fire and carry out evacuation procedures. The unit does not cover the competencies needed to become a professional firefighter and will be covered in other related units in relevant standards.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare for fire	1.1 Procedures related to a fire emergency are accessed, interpreted and rehearsed 1.2 Location of firefighting equipment is identified and the equipment is checked in accordance with organizational procedures and referred for maintenance/replacement as required
2. Carry out initial notification and assessment	2.1 Nature and scope of the fire is identified, confirmed and reported to appropriate personnel 2.2 Fire situation is assessed and appropriate course of action is determined in keeping with requirements for personal safety 2.3 Notification of fire threat is undertaken in accordance with authorized procedures 2.4 Emergency evacuation procedures are followed, where appropriate, and in accordance with organizational procedures
3. Extinguish fires	3.1 Fires are extinguished using the appropriate equipment, materials and procedures 3.2 Extinguisher is applied to ensure fast knockdown of fire 3.3 Extinguisher is used at the appropriate range and time 3.4 Extinguisher is used to minimize damage to equipment and facilities and to minimize risk of injury to personnel

### **RANGE STATEMENT**

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance.

Firefighting equipment may include,

- ✓ Extinguishers
- ✓ Fire blankets
- ✓ Fire hose reels
- ✓ Fire hydrants
- ✓ Firefighting vehicles
- ✓ Personal protection equipment (PPE)

**Tools, equipment and material used in this unit may include:**

All relevant equipment to develop the competency of providing fire skills relevant.

**ASSESSMENT GUIDE**

**Forms of assessment**

Assessment methods must be chosen to ensure that application of firefighting can be practically demonstrated. Methods must include assessment of knowledge as well as assessment of practical skills.

**Assessment context**

This unit may be assessed in a simulated environment

**Critical aspects (for assessment)**

Assessment must ensure:

- ✓ Use of real fire related equipment
- ✓ Ability to assess situations requiring responding to fire and to decide on a plan of action including seeking help

**UNDERPINNING KNOWLEDGE AND SKILLS**

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be developed:</p> <ul style="list-style-type: none"> <li>✓ composition of teams, and roles and responsibility of team members</li> <li>✓ fire alarm systems</li> <li>✓ local area emergency procedures</li> <li>✓ principles of teamwork, team aims and objectives</li> <li>✓ site emergency plan</li> <li>✓ techniques for supporting others/team members</li> <li>✓ types, operations and application of firefighting equipment including extinguishers, hose reels and, where appropriate, monitors</li> <li>✓ verbal and non-verbal communication techniques including language, language style, active listening</li> </ul>	<p>Skills to be development:</p> <ul style="list-style-type: none"> <li>✓ access, read and interpret local emergency procedures</li> <li>✓ apply evacuation procedures</li> <li>✓ assess fire situation and notify authorities</li> <li>✓ carry out periodic checks on firefighting equipment</li> <li>✓ identify emergency alarms and match with response requirement</li> <li>✓ identify, select and use firefighting equipment</li> <li>✓ participate in a team</li> <li>✓ use a variety of verbal and non-verbal communication techniques</li> </ul>

<b>UNIT TITLE</b>		<b>Apply Science and Engineering Measurements</b>			
<b>DESCRIPTOR</b>	This unit of competency covers the ability to manage the day-to-day running of science teaching laboratories and the preparation of practical experiments, demonstrations also determining simple drawings.				
<b>CODE</b>		<b>LEVEL</b>		<b>CREDIT</b>	04

<b>ELEMENTS OF COMPETENCIES</b>		<b>PERFORMANCE CRITERIA</b>	
1. Apply basic mathematics	1.1. Perform simple calculations on: fractions and decimals, calculations to a number of significant figures, decimal places 1.2. Identify and use the multiples and sub-multiples of units 1.3. Perform calculations on: perimeter and area of plane figures (i.e. square and rectangle, triangle, circle), volume and surface area (i.e. cube, rectangular prism, cylinder), mass of containers and their contents (i.e. cube, rectangular prism, cylinder) 1.4. Perform mathematical calculations involving formulas, angles, triangles and geometric construction 1.5. Identify and use formulas for SI quantities: length, area, volume, mass, density 1.6. Identify the elements of a circle Parts: radius, diameter, circumference, chord, sector, segment, arc, tangent 1.7. Identify and use the ratio of sides of 45° and 60° right angled triangles. 1.8. Identify and use the rules of 3:4:5 and 5:12:13 for the sides of right-angled triangles. 1.9. Solve simple workshop problems involving Pythagoras and right-angled triangles. 1.10. Evaluate and transpose simple formulae associated with workshop problems. 1.11. Convert minutes and seconds to decimal fractions of a degree.		
2. Apply Fundamental of Science	2.1 Systems of measurements, Motion in one dimension and two dimensions 2.2 Newton's Laws I & II 2.3 Gravity 2.4 Mechanics of solids and fluids		
3. Demonstrate simple drawing	3.1. Identify angles, plane figures and types of drawing 3.2. Identify first and third angle orthographic projections of isometric or oblique views. 3.3. Identify single plane sectional views of simple components. 3.4. Perform basic drafting 3.5. Read and interpret drawings 3.6. Introduce basics of AUTOCAD		
4. Undertake relevant measurement	4.1 Identify measuring devices 4.2 Follow appropriate measuring procedures 4.3 Keep record of the measurements		

## RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

#### Risk assessment

- ✓ identifying and analysing the risk, and considering potential consequences in terms of exposure and hazard and likelihood of each
- ✓ assessing the effectiveness of existing controls
- ✓ determining level of risk, comparing with pre-established criteria for tolerance (or as low as reasonably achievable) and ranking of risks requiring control

#### **Tools, equipment and materials required may include:**

##### Typical materials

- ✓ distilled water, reagents, chemicals, disinfectants, detergents, agar media and plates
- ✓ consumable items, such as syringes, pipette tips and weigh boats
- ✓ oils/lubricants, fuels, industrial gases and cryogenics, such as dry ice and liquid nitrogen
- ✓ equipment spares, such as fuses, bulbs and batteries

##### Typical equipment

- ✓ analytical instruments, such as ultraviolet-visible (UV-VIS) and atomic absorption spectrometers (AAS), gas chromatography (GC) and high-pressure liquid chromatography (HPLC)
- ✓ containment equipment, such as fume hoods, biohazard containers and biological safety cabinets, and animal cages
- ✓ general equipment, such as autoclaves, ultrasonic cleaners, dishwashers, refrigerators, freezers, ovens, microwave ovens, incubators, gas cylinders and muffle furnaces
- ✓ specialised equipment, such as microtomes and tissue processors, cell counters and staining machines, light and fluorescence microscopes, pH meters and ion selective electrodes
- ✓ bench equipment, such as thermometers, balances, blenders, centrifuges and separating equipment, water baths, hotplates, mantles, burners, glassware (burettes, pipettes), plastic ware, glass, plastic and quartz cuvettes
- ✓ teaching aids, such as technology players and computers

## **ASSESSMENT GUIDE**

### **Forms of assessment**

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Competency Standard.

### **Critical aspects (for assessment)**

Assessors should ensure that candidates have knowledge of:

- ✓ principles of risk assessment, risk management and hierarchy of control
- ✓ typical hazards and risk assessments associated with practical science classes and demonstrations
- ✓ risk control methods for typical hazards
- ✓ principles of small scale budgeting, operational planning and efficient resource use
- ✓ scientific terminology and technical details of sampling, testing, equipment and instrumentation used in the education program's practical activities
- ✓ principles of good laboratory practice (GLP)
- ✓ awareness of environmental sustainability issues as they relate to the work task
- ✓ legal, ethical and work health and safety (WHS) requirements specific to the work task.

### **Assessment conditions**

- ✓ use of suitable facilities, equipment and resources, including:

- laboratory/field work environment, equipment and materials
  - personal protective equipment (PPE) and safety equipment
  - WHS management system, policies and procedures
- ✓ modelling of industry operating conditions, including:
- access to staff and students.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be learnt:</p> <ul style="list-style-type: none"> <li>✓ Learn about basic mathematics with focus on Perform simple calculations on fractions and decimals, calculations to a number of significant figures, decimal places, perimeter and area of plane figures, volume and surface area.</li> <li>✓ Identify and use formulas for SI quantities for length, area, volume, mass, density</li> <li>✓ Solve simple workshop problems involving Pythagoras and right-angled triangles and Evaluate and transpose simple formulae associated with workshop problems.</li> <li>✓ Systems of measurements, Motion in one dimension and two dimensions</li> <li>✓ Newton's Laws I &amp; II</li> <li>✓ Gravity</li> <li>✓ Mechanics of solids and fluids</li> <li>✓ Identify angles, plane figures and types of drawing</li> <li>✓ Identify first and third angle orthographic projections of isometric or oblique views.</li> <li>✓ Identify single plane sectional views of simple components.</li> <li>✓ Perform basic drafting</li> <li>✓ Read and interpret drawings</li> <li>✓ Identify measuring devices</li> <li>✓ Follow appropriate measuring procedures</li> <li>✓ Keep record of the measurements</li> </ul>	<p>Skilled to be developed:</p> <ul style="list-style-type: none"> <li>✓ Demonstrate capacity to undertake basic mathematics with focus on Perform simple calculations on fractions and decimals, calculations to a number of significant figures, decimal places, perimeter and area of plane figures, volume and surface area.</li> <li>✓ Interpret use formulas for SI quantities for length, area, volume, mass, density</li> <li>✓ Solve simple workshop problems involving Pythagoras and right-angled triangles and Evaluate and transpose simple formulae associated with workshop problems.</li> <li>✓ Perform calculations related to Mechanics of solids and fluids</li> <li>✓ Undertake basic drawing including identification of angles, plane figures and types of drawing</li> <li>✓ Identify first and third angle orthographic projections of isometric or oblique views.</li> <li>✓ Identify single plane sectional views of simple components.</li> <li>✓ Perform basic drafting</li> <li>✓ Read and interpret drawings</li> </ul>

<b>UNIT TITLE</b> Perform workshop practice					
<b>DESCRIPTOR</b>	Students commencing a career in welding need to develop a good basic knowledge of mechanical fittings practices prior to proceeding to the development of welding knowledge and skills.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Identify and explain functions tools used in mechanical workshop	1.1 Sketch and name tools used in the welding workshop 1.2 Explain functions of the identified tools and scope of their use
2. Identify and explain properties of various pipes and their applications	2.1 Identify types of pipes used in plumbing and sewerage services 2.2 Interpret functions and their application within plumbing and sewerage operations 2.3 Demonstrate joining methods of the pipes 2.4 Familiarize with fitting used on these different pipes
3. Use measuring instruments properly	3.1 Identify names and functions of various measuring instruments used in mechanical workshop 3.2 Demonstrate use of various measuring instruments
4. Undertake basic arc welding	4.1 Apply general and electrical safety related to welding 4.2 Observe safe connection of welding plants to electrical networks
5. Perform basic workshop practices	5.1 Undertake marking out on metals 5.2 Perform metal cutting using hack-saw 5.3 Perform drilling holes on metal pieces 5.4 Perform filing on metal pieces

### **RANGE STATEMENT**

Work connected to this unit shall take place at a mechanical workshop with welding equipment installed.

### **Tools, equipment and materials required may include:**

- ✓ Basic Workshop Tools
- ✓ Basic Measuring Instruments
- ✓ Electrical connection to welding equipment

## ASSESSMENT GUIDE

### Forms of assessment

Continuous/holistic assessment is suitable to assess the competencies of a welder with regard to this unit.

### Critical aspects (for assessment)

The assessment must confirm that the candidate is able to:

- ✓ Identify basic workshop tools
- ✓ Undertake basic workshop practices such as cutting, filing, hack sawing
- ✓ Perform electrical safety related to welding
- ✓ Identify metals and their applications,

### Assessment conditions

The candidate will have access to

- ✓ All tools, equipment, material, blue prints, sketches, workshop drawings and other documentation required.
- ✓ The candidate will have access to all welding tools and equipment including welding accessories

The candidate will be required to:

- ✓ Orally, or by other methods of communication, answer questions asked by the assessor.
- ✓ Identify superiors 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, and that he/she possess the required underpinning knowledge.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"><li>✓ Basic workshop tools</li><li>✓ Basic measuring instruments</li><li>✓ Basic electrical safety</li><li>✓ Metals and their applications in engineering</li></ul>	<ul style="list-style-type: none"><li>✓ Proper use of tools</li><li>✓ Perform workshop practices</li><li>✓ Wear safety equipment</li><li>✓ Undertake electrical connection of welding plant with supervision.</li></ul>

<b>UNIT TITLE</b>		<b>Apply industrial electrical knowledge and skills</b>			
<b>DESCRIPTOR</b>	This unit covers the competencies required to install industrial electrical control and protective switchgear, lay conduits/ trunking/ ducts and wire single and multiphase circuits, install electrical accessories, fixtures and fitting using specified tools, equipment and material, according to electrical layout plans, conforming with standards and regulations.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>		<b>PERFORMANCE CRITERIA</b>	
1. Apply basic electrical knowledge	1.1.	Apply the Concepts and Knowledge of the following	<ul style="list-style-type: none"> <li>✓ Voltage</li> <li>✓ Current</li> <li>✓ Resistant</li> <li>✓ Ohms Laws</li> <li>✓ Electrical Circuit</li> </ul>
2. Lay and fix electrical conduits / trunking / ducts etc.,	2.1.	Locations of the electrical points identified and marked according to layout plan	
	2.2.	Locations and directions of conduit/ trunking/ ducts etc marked according to the layout plan	
	2.3.	Walls chipped where necessary, for the burying of conduit according to its sizes and number of runs	
	2.4.	Steel conduits, trunking/ducts etc selected, prepared and fixed in pre-identified locations, clamped firmly, paying attention to the sizes and number of cables/wires to be accommodated according to the wiring diagrams/ regulations/ standards	
	2.5.	Conduit accessories firmly buried/ mounted at pre-identified locations, according to layout plan, at specified depths and heights for each electrical point in conformity with regulations/ standards	
3. Install and wire main electrical control and protective switchgear	2.1	Main power control switch gear fixed/ mounted at preidentified locations, according to the layout plan / diagram	
	2.2	Stand by power supply equipment and change-over switchgear installed as per manufacturer's specifications	
	2.3	Cables from the main power control switchgear to the main power supply/ transformers laid and terminated as specified/ detailed in the layout plan/ regulations/ standards	
	2.4	Earth electrodes installed and terminated at the pre-identified locations, in accordance with layout plan and conforming with regulations and standards	
	2.5	Installations tested for safe and optimum performance according to standards and MEA regulations	
4. Wire electrical final circuits	4.1.	Type and size of wires and cables selected for each final circuit referring to the wiring diagram/ standards	
	4.2.	Wiring carried out in accordance with the wiring diagram/ layout plan and in conformity with standards and MEA regulations	



	<p>4.3. Electrical accessories in the final circuits mounted and wires terminated as per wiring diagrams</p> <p>4.4. Special wiring for construction sites, temporary buildings, agricultural and historical sites carried out according to regulations and standards</p> <p>4.5. Electrical installations in hazardous areas carried out according to regulations and standards</p> <p>4.6. Electrical appliances, equipment in final circuits fixed according to the wiring diagram/ standards</p>
5. Install wiring for standby power supplies	<p>5.1. Trucking/ conduit/ ducts etc. for laying of power cables installed according to wiring diagrams</p> <p>5.2. Earth electrodes for the stand by power supply installed and connected as per manufacturer's specifications/ regulations and standards</p> <p>5.3. Power changeover switchgear/ control and protective switchgear required for the stand by power supply installed and cables laid and terminated as per manufacturer's specifications/ regulations/ standards</p> <p>5.4. Power changing over systems checked for correct phase sequence and performance</p>

## RANGE STATEMENT

Work takes place in construction worksite or in an industrial/ commercial building where the electrician is called to perform the job

### Context

Industrial electrical wiring circuits include:

- ✓ Lightning circuits
- ✓ Circuits for fixed electrical equipment/ appliances
- ✓ Circuits for industrial socket outlets
- ✓ Circuits for special locations and hazardous areas
- ✓ Circuits for stand by power supply
- ✓ Ring and radial circuits for socket outlets
- ✓ Circuits for high current rated electrical machinery and equipment

Electrical control and protective switchgear:

- ✓ Main electrical control and protective and switchgear
- ✓ Sub circuit control and protective and switchgear
- ✓ Metering and monitoring devices
- ✓ Standby generator power change over switchgear

Work is performed to drawings, sketches, specifications and instructions as appropriate and to predetermined standards of quality and safety.

The instructional and other reference data connected with this unit include:

- ✓ Layout drawings
- ✓ Block diagrams
- ✓ Single line & multi line representations
- ✓ Wiring diagrams
- ✓ Electrical specifications
- ✓ Manufacturer's instructional manuals, as appropriate

Sources of information/documents include:

- ✓ MEA regulations
- ✓ Manufacturer specifications
- ✓ Customer requirements
- ✓ Industry / workplace codes of practice

Occupational health & safety practices which should be abided by:

- ✓ Occupational health & safety legislations
- ✓ MEA regulations

Electrician's operational methods include:

- ✓ Reading / interpreting layout plans/wiring diagrams
- ✓ Electrical measurements & fault tracing using specified electrical test & measuring instruments
- ✓ Testing, servicing and replacement of defective control and protective switchgear and accessories
- ✓ Removal and replacement of defective cables / wires,
- ✓ Fault finding using smell, sound & sight assessments for damage, corrosion, wear and electrical short/broken circuits

Methods should be applied under normal operating conditions.

**Tools, equipment and material used in this unit may include:**

- ✓ Electrician's tool kit
- ✓ Insulations resistance tester
- ✓ Earth Electrode Resistance tester
- ✓ Prospective Earth Fault Current (PEFC) Tester
- ✓ Personal protective equipment
- ✓ Multi-meter
- ✓ Earth fault loop impedance tester
- ✓ Prospective Short-Circuit Current (PSCC) Tester
- ✓ Draw wire

Work is performed to drawings, sketches, specifications and instructions as appropriate and to predetermined standards of quality and safety.

## **ASSESSMENT GUIDE**

### **Forms of assessment**

Continuous assessment coupled with gathered evidence of performance is suitable for this unit

### **Assessment context**

This unit shall be assessed on the job or in a simulated environment demonstrated by an individual working alone or as part of a team.

This unit could be assessed individually or in conjunction with other related units

### **Critical aspects (for assessment)**

- ✓ Assessment must confirm the candidate's ability to:
- ✓ Safety of self, others and property
- ✓ Regulations and standards

### **Assessment conditions**

The candidate will have access to:

- ✓ All tools, equipment, material and documentation required.

The candidate will be permitted to refer to the following documents:

- ✓ Relevant workplace procedures
- ✓ Relevant product and manufacturing specifications
- ✓ Relevant drawings, manuals, codes, standards and reference material

The candidate will be required to:

Orally or by other methods of communication, answer questions asked by the assessor

- ✓ Identify superiors 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, and that he/she possess the required underpinning knowledge

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be learnt:</p> <ul style="list-style-type: none"> <li>✓ Fundamentals of electricity, ohms law, electrical circuits and measurements.</li> <li>✓ Read and interpret Electrical layout plans/wiring diagrams</li> <li>✓ Types of electrical control and protective switchgear and accessories used in industrial electrical circuits</li> <li>✓ Types of electrical wires and cables, including underground cables, their ratings and its applications</li> <li>✓ Types of electrical accessories used for industrial electrical installations and their applications.</li> <li>✓ Types of electrical conduits/ducts, casing and capping etc., and their cutting/joining/fixing methods</li> <li>✓ Types of electrical wiring for industrial purpose</li> <li>✓ Types of electrical tools and measuring instruments used in industrial installation work</li> <li>✓ Types of insulation material used in electrical installations</li> <li>✓ Types of earth electrodes and their applications in electrical installations</li> <li>✓ Record keeping and reporting</li> <li>✓ MEA regulations</li> </ul>	<p>Skills to be developed:</p> <ul style="list-style-type: none"> <li>✓ Refer electrical layout plans, wiring diagrams etc., carry out industrial wiring according to current electrical wiring regulations and work accordingly</li> <li>✓ Select and use correct type and rating of industrial electrical control and protective switchgear, according to the wiring diagram/ layout plan</li> <li>✓ Select and use correct type and size of wires and cables, according to the rating of each circuit</li> <li>✓ Select and use correct type of industrial type electrical accessories, according to the type of each circuit</li> <li>✓ Select the correct type and size of electrical conduit/ducts, casing and capping etc., cut/bend /join/thread and fix them according to the requirements of each circuit</li> <li>✓ Use power tools such as electric portable drill, angle grinder etc.,</li> <li>✓ Use correct type of electrician's tools and measuring instruments</li> <li>✓ Splice, joint, terminate and solder insulate joints in electrical wires and cables including underground cables, using specified tools</li> <li>✓ Select and use the most appropriate and cost-effective earth installations, according the soil conditions</li> <li>✓ Maintain records</li> </ul>

<b>UNIT TITLE Operate chemical separation equipment</b>					
<b>DESCRIPTOR</b>	This unit covers the operation of chemical separation equipment where the feed is usually single phase. It covers the range of separation equipment which rely on a phase change or chemical change to enact the separation and includes crystallizers, ion-exchange filters, absorbers and similar equipment.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare for work	1.1. Identify work requirements 1.2. Identify and control hazards 1.3. Coordinate with appropriate personnel
2. Operate chemical separation equipment	2.1 Identify the type of chemical separation equipment 2.2 Start up and shut down chemical separation equipment according to type and duty 2.3 Monitor plant frequently and critically throughout shift using measured/indicated data and senses (e.g. sight and hearing), as appropriate 2.4 Adjust flow and pressure as appropriate to type of separation equipment 2.5 Complete routine checks, logs and paperwork, taking action on unexpected readings and trends
3. Isolate and de-isolate plant	3.1. Isolate plant 3.2. Make safe for required work 3.3. Check plant is ready to be returned to service 3.4. Prepare plant for return to service

### **RANGE STATEMENT**

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Codes of practice / standards

Where reference is made to industry codes of practice, and/or Maldivian/international standards, the latest version must be used.

### **Tools, equipment and materials required may include:**

Separation equipment covered by this competency includes all types of chemical separation equipment for gaseous, liquid and solids separation duties, where the feed is essentially in a single phase and the separation relies on a change of the material or a chemical process to enact the separation, such as:

- ✓ Crystallizers
- ✓ Ion-exchange filters/columns
- ✓ Precipitators
- ✓ Absorbers/absorbers

## ASSESSMENT GUIDE

### Forms of assessment

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

### Critical aspects (for assessment)

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

These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response.

### Assessment conditions

During the assessment, students need to have access to the full range of equipment involved with chemical separation, including relevant tools and consumables to smoothly impelement work stipulated in the unit.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
Knowledge to be learnt: <ul style="list-style-type: none"><li>✓ all items on a schematic of the separator system and the function/s of each</li><li>✓ principles of operation of separation equipment</li><li>✓ factors affecting efficient operation of the separation equipment</li><li>✓ related physics and chemistry linked to the operation</li><li>✓ function and troubleshooting of major internal components and their problems,</li><li>✓ typical problems with separation equipment and their remedy</li><li>✓ process parameters and limits (e.g. temperature, pressure, flow and pH)</li><li>✓ routine problems, faults and their resolution</li><li>✓ relevant alarms and actions</li></ul>	Skills to be developed: <ul style="list-style-type: none"><li>✓ efficient and effective operation of plant/equipment</li><li>✓ hazard analysis</li><li>✓ completing plant records</li><li>✓ communication and problem solving.</li><li>✓ Apply separations skills in the workplace</li><li>✓ Interpret step by step process of separation</li><li>✓ Perform diagnosis on the performance of the separation equipment</li><li>✓ Identify alarms and attend operator related maintenance activities.</li></ul>

<b>UNIT TITLE</b> Operate and maintain water Treatment Plant					
<b>DESCRIPTOR</b>	This unit of competency covers the skills and knowledge required to operate Water Treatment Plant and distribution system. This unit of competency applies to operators who are required to start up and shut down the equipment, monitor and adjust process parameters, and identify operational problems and take appropriate action.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	04

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare for work	1.1. Receive and give shift handover 1.2. Identify work requirements 1.3. Identify and control hazards 1.4. Coordinate with appropriate personnel 1.5. Check for recent work undertaken on filter 1.6. Note any outstanding/incomplete work 1.7. Check operational status of plants
2. Operate water Treatment Plant	2.1 Identify the types of filter and its duty 2.2 Apply theoretical knowledge related to water treatment plant operation 2.3 Complete routine checks, logs and paperwork taking action in accordance with procedures on unexpected readings 2.4 Handling materials and substances
3. Operate distribution system	3.1 Maintain set pressure 3.2 Complete routine checks, logs and paperwork taking action in accordance with procedures on unexpected readings
4. Recognise and take action on abnormal situations in accordance with procedures	4.1. Monitor plant frequently and critically throughout shift using measured/indicated data and senses 4.2. Identify impacts of any changes upstream and downstream 4.3. Recognise situations which may require action 4.4. Resolve routine problems 4.5. Take actions on other abnormal situations to make safe and have the situation resolved
5. Isolate and de-isolate plant	5.1. Complete any required pre-start checks 5.2. Startup/shut down/changeover plant according to the plant type and duty in liaison with other personnel 5.3. Isolate Plant 5.4. Make safe for required work 5.5. Check Plant is ready to be returned to service 5.6. De-isolate and prepare Plant for return to service
6. Perform log taking and document management	6.1. Identify types and function of logs and documents required 6.2. Undertake recording of logs and management of documents

### **RANGE STATEMENT**

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Systems and Equipment includes:

- ✓ Rainwater treatment systems
- ✓ Post treatment, Pretreatment and sea water RO systems

Materials and substances include:

- ✓ filters and membranes, such as plate and frame filters, leaf filters, cartridge filters, bed (sand/gravel) filters and disk/edge filters
- ✓ Pipes
- ✓ Reject water
- ✓ Chemicals

### **Tools and equipment required:**

All the relevant tools and equipment

- ✓ pressure/flow monitoring equipment
- ✓ minor equipment to supply filter and remove filtrate/cake which is integral to the operation of the filter
- ✓ mixers and chemical batching facilities
- ✓ chemical testing and analysis equipment
- ✓ communication equipment
- ✓ flow meters
- ✓ screens, including raked bar screens

## **ASSESSMENT GUIDE**

### **Forms of assessment**

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

### **Critical aspects (for assessment)**

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

- ✓ early warning signs of equipment/processes needing attention or with potential problems are recognised
- ✓ the range of possible causes can be identified and analyzed and the most likely cause determined
- ✓ appropriate action is taken to ensure a timely return to full performance
- ✓ obvious problems in related plant areas are recognised and an appropriate contribution made to their solution.
- ✓ applying water treatment processes, including operating mechanical equipment
- ✓ using chemicals safely and according to organisational procedures
- ✓ conducting regular routine inspection of mechanical equipment
- ✓ identifying hazards and applying appropriate safety procedures
- ✓ gathering and recording data
- ✓ reporting anomalies

These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk-through forming part of the response.

### **Assessment conditions**

Access to the workplace and resources including:

- ✓ documentation that should normally be available in a water industry organisation
- ✓ relevant codes, standards and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
Knowledge to learnt: <ul style="list-style-type: none"> <li>✓ water cycle</li> <li>✓ sources of water</li> <li>✓ uses of water, both domestic and industrial</li> <li>✓ physical, chemical and microbiological characteristics of water within the water treatment process</li> <li>✓ water quality characteristics</li> <li>✓ reasons for water treatment</li> <li>✓ types of treatment plants and processes</li> <li>✓ major chemicals and equipment used</li> <li>✓ water treatment plant hazards</li> <li>✓ safety equipment</li> <li>✓ reasons for data and information collection</li> <li>✓ R/O and NF</li> </ul>	Skills to be developed: <ul style="list-style-type: none"> <li>✓ apply policies, procedures and standards</li> <li>✓ recognise and report operational problems</li> <li>✓ use safety equipment and personal protective equipment</li> <li>✓ collect and test samples</li> <li>✓ interpret material safety data sheets (MSDS)</li> <li>✓ receive and apply instructions</li> <li>✓ use literacy skills in regard to verbal and written communication in the workplace</li> <li>✓ communicate with other employees and people that interact within work environment</li> </ul>



<b>UNIT TITLE</b>		<b>Monitor systems and equipment</b>			
<b>DESCRIPTOR</b>	This unit covers the operation and monitoring of a complex compressor system and associated equipment. Moreover, maintenance of an effective plant.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	03

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare for work.	1.1. Identify work requirements 1.2. Identify and control hazards 1.3. Coordinate with appropriate personnel
2. Startup systems/ equipment.	2.1. Perform pre-start-up checks 2.2. Check the status of the system/equipment prior to commencing start-up process 2.3. Check all required auxiliary systems, including oil and water, to confirm their operational condition 2.4. Startup individual items of equipment and the entire system as required 2.5. Bring the system to required operating conditions.
3. Control and monitor the system.	3.1. Initiate load-up through the selection of appropriate speed or cycle 3.2. Monitor and adjust downstream equipment as required 3.3. Monitor the operational condition and safety status of the unit/system and take appropriate action 3.4. Adjust operational speeds and operating cycles as required 3.5. Monitor or activate safety systems to ensure that any system shutdowns are controlled and conducted safely and effectively.
4. Shut down systems/equipment.	4.1. Confirm shutdown cause with other personnel and plant operators before commencing to isolate or shut down the equipment/system 4.2. Implement control measures to minimise damage and hazards 4.3. Shut down system according to procedures 4.4. Inspect the system/equipment as required by procedures 4.5. Isolate and purge systems/equipment and prepare plant for maintenance as required.
5. Maintain plant effectiveness	5.1. Frequently and critically monitor all plant throughout shift 5.2. Use measured/indicated data and smell, sight, sound and feel as appropriate to monitor plant 5.3. Identify critical equipment/processes and tune their performance 5.4. Identify issues likely to impact on plant performance and take appropriate action 5.5. Predict impact of a change in one unit/area on other plant units/areas and communicate this to relevant people 5.6. Test trips and alarms as required

## **RANGE STATEMENT**

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Systems and Equipment includes:

- ✓ Pneumatic System,
- ✓ electronic digital monitoring systems,
- ✓ recording systems,
- ✓ alarms and process control systems,
- ✓ control valves,
- ✓ Blower,
- ✓ Fans,
- ✓ Valves,
- ✓ Pumps, and other ancillary systems/equipment

Appropriate action includes:

- ✓ determining problems needing action
- ✓ determining possible fault causes
- ✓ rectifying problem using appropriate solution within area of responsibility
- ✓ following through items initiated until final resolution has occurred
- ✓ reporting problems outside area of responsibility to designated person

### **Tools and equipment required:**

It is imperative that prior to the assessment, students need to be supplied with All the relevant tools and equipment.

## **ASSESSMENT GUIDE**

### **Forms of assessment**

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

### **Critical aspects (for assessment)**

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

### **Assessment conditions**

Prior to the assessment, students need to have access to the full range of tools and equipment required for monitoring pneumatic systems and equipment.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be learn:</p> <ul style="list-style-type: none"> <li>✓ relevant alarms and actions</li> <li>✓ plant process idiosyncrasies</li> <li>✓ all items on a schematic of the plant item and the function of each</li> <li>✓ correct methods of starting, stopping, operating and controlling process</li> <li>✓ corrective action appropriate to the problem cause</li> <li>✓ function and troubleshooting of major components and their problems</li> <li>✓ types and causes of problems within operator's scope of skill level and responsibility.</li> <li>✓ physics and chemistry relevant to the process unit and the materials processed</li> <li>✓ process parameters and limits, eg temperature, pressure, flow, pH</li> <li>✓ principles of operation of plant/equipment</li> <li>✓ power and torque envelopes</li> <li>✓ compression flows and characteristics</li> <li>✓ liquid and product separation principles</li> <li>✓ product characteristics and tolerances</li> <li>✓ flow charts</li> <li>✓ flow, pressure, temperature, levels and rates.</li> </ul>	<p>Skills to be developed :</p> <ul style="list-style-type: none"> <li>✓ efficient and effective operation of plant/equipment</li> <li>✓ hazard analysis</li> <li>✓ completing plant records</li> <li>✓ communication</li> <li>✓ problem solving</li> <li>✓ Competence also includes the ability to isolate the causes of problems to an item of equipment within the compressor system and to distinguish between causes of problems/alarm/fault indications such as:               <ul style="list-style-type: none"> <li>• process gas variations</li> <li>• instrument failure/wrong reading</li> <li>• electrical failure</li> <li>• mechanical failure</li> <li>• operational problem.</li> </ul> </li> </ul>

UNIT TITLE					
<b>Collect samples and perform basic water tests</b>					
DESCRIPTOR	This unit of competency covers the ability to collect samples at field or production sites using specified equipment and standard or routine procedures. This unit of competency is applicable to production operators, field assistants and laboratory assistants in all industry sectors.				
CODE		LEVEL	III	CREDIT	04

ELEMENTS OF COMPETENCIES		PERFORMANCE CRITERIA			
1. Prepare for sampling	1.1. Confirm the purpose, priority and scope of the sampling request 1.2. Liaise with relevant personnel to arrange site access and all necessary clearances/permits 1.3. Identify site hazards and review workplace safety procedures 1.4. Confirm what samples are to be collected, from where, how and when 1.5. Assemble all specified sampling equipment, safety equipment, materials and containers 1.6. Conduct pre-use and cleanliness checks of all items to ensure they are fit for purpose 1.7. Check all items against given inventory and stow them to ensure safe transport				
2. Collect sampling	2.1 Locate sampling points and services at the site 2.2 Remove security devices, such as locks and covers as required 2.3 Seek advice if the required samples cannot be collected or if procedures require modification 2.4 Select and use required sampling equipment in accordance with given procedures 2.5 Closely follow sampling procedures to obtain required samples and maintain their integrity 2.6 Record all labelling information in accordance with workplace/legal traceability requirements 2.7 Record sample appearance, environmental conditions and any other factors that may impact on sample integrity 2.8 Replace security devices, such as locks and covers as required				
3. Perform basic water test	3.1 Identify daily water tests to be performed aligned to EPA standard. 3.2 Perform basis water tests				
4. Update documentation	4.1. Record log of the tests performed including their results. 4.2. Communicate the log to relevant stakeholders.				

### RANGE STATEMENT

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Basic water tests include:

- ✓ Free chlorine
- ✓ pH

- ✓ Physical Appearance
- ✓ Electrical Conductivity
- ✓ Total Coliform
- ✓ Fecal Coliform
- ✓ Turbidity
- ✓ Total Dissolved Solids

**Safety procedures**

Safety procedures include, but are not limited to, one or more of:

- ✓ Use of PPE
- ✓ Handling, labelling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer instructions and workplace procedures and regulations
- ✓ Regular cleaning and / or decontamination of equipment
- ✓ Use of machinery guards
- ✓ Signage, barriers, service isolation tags, traffic control and flashing lights, lock out and tag-out procedures

**Tools and equipment required:**

It is imperative that prior to the assessment, students need to be supplied with All the relevant tools and equipment.

**ASSESSMENT GUIDE**

**Forms of assessment**

Assessment for the unit needs to be continuous and holistic and must include real or simulated workplace activities.

**Critical aspects (for assessment)**

It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of mathematics and drawing. This unit may be assessed in conjunction with all and units which form part of the normal job role.

**Assessment conditions**

During the assessment, access to the full range of equipment involved in collecting samples and perform basic water tests need to be organised and arranged.

**UNDERPINNING KNOWLEDGE AND SKILLS**

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
Knowledge to be learnt: <ul style="list-style-type: none"> <li>✓ terminology and concepts, including sample, contamination, traceability, integrity and chain of custody, metrology and the international system of units (SI)</li> <li>✓ types of samples, including grab samples (disturbed or undisturbed materials), composite samples (such as time, flow proportioned and horizontal/vertical cross section), and quality control samples (such as controls, background, duplicate and blanks)</li> <li>✓ characteristics of product/materials</li> </ul>	Skills to be developed: <ul style="list-style-type: none"> <li>✓ locating services at sites</li> <li>✓ collecting samples at field or production sites on different occasions using specified equipment and standard/routine procedures</li> <li>✓ collecting different types of samples</li> <li>✓ collecting samples efficiently, safely and with minimal environmental impact in accordance with sampling procedures and plans</li> <li>✓ maintaining the integrity and security of samples following safety procedures, workplace and/or legal traceability requirements</li> </ul>

<p>sampled as part of job role</p> <ul style="list-style-type: none"> <li>✓ purpose for which the samples have been collected</li> <li>✓ function of key sampling equipment/materials and principles of operation</li> <li>✓ sampling procedures covering labelling, preparation, storage, transport and disposal</li> </ul>	<ul style="list-style-type: none"> <li>✓ completing sampling records using workplace procedures</li> <li>✓ recognising own limitations and seeking timely advice</li> <li>✓ liaising with others to access sites and conduct sampling efficiently.</li> </ul>
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<b>UNIT TITLE</b>					
<b>Monitor and operate power generation system</b>					
<b>DESCRIPTOR</b>	This unit of competency describes the outcomes required to operate, monitor and maintain power generation systems and record and report operating data. The unit applies to production support operators who monitor and control power generation facilities. This typically involves working in a facility with complex integrated equipment and continuous operations.				
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>	04

<b>ELEMENTS OF COMPETENCIES</b>		<b>PERFORMANCE CRITERIA</b>	
1. Confirm operational status	1.1. Check production requirements at start of shift and plan daily work activities in line with organisational safety and standard operating procedures. 1.2. Confirm power generation processes are within operational specifications by observation and inspection. 1.3. Maintain process supplies to meet production requirements. 1.4. Communicate operational status to relevant personnel.		
2. Monitor and control power generation plant operation	2.1 Confirm operational status by inspection and routine observation. 2.2 Monitor and maintain continuing process supplies to meet production requirements. 2.3 Monitor and maintain power output demand and distribution system to meet production requirements. 2.4 Handling materials and substances		
3. Record and report power generation performance	3.1. Record pressures, temperatures and flows. 3.2. Record power generation processes and data in operating log. 3.3. Record and report maintenance requirements.		

### **RANGE STATEMENT**

This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Power generation system and equipment includes:

- ✓ Solar PV Systems
- ✓ Diesel generator

Materials and substances include:

- ✓ Diesel
- ✓ Lubricating oil
- ✓ Filters

### **Tools and equipment required:**

It is imperative that prior to the assessment, students need to be supplied with all the relevant tools and equipment.

## ASSESSMENT GUIDE

### Forms of assessment

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this competency standard.

### Critical aspects (for assessment)

As part of the assessment planned for this unit, it is important that work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment.

### Assessment conditions

- ✓ To facilitate smooth assessment, students need to have access to power house with generator to ensure they can practice and perform all the tasks stipulated in the assessment.
- ✓ access to the full range of equipment involved in integrated continuous manufacturing of power generation systems in a pulp or paper manufacturing facility, including chemical products:
  - high and low voltage transformers
  - steam or gas turbine driven alternators
  - switchboards
  - water systems and auxiliary plant
  - circuit breaker
  - AC/DC generation and distribution systems
  - analogue and digital instrumentation
- ✓ personal protective equipment suitable for operating a power generation system
- ✓ template operating log and documents for recording power generation processes and maintenance requirements
- ✓ organisational workplace health and safety and standard operating procedures

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be learnt:</p> <ul style="list-style-type: none"><li>✓ power generation plant layout</li><li>✓ purpose, features and operation of power generation and distribution systems.</li><li>✓ operation and application of electronic and other control systems</li><li>✓ principles of operation of transformers and circuit protection systems</li><li>✓ AC/DC generation principles</li><li>✓ power factor characteristics and effects</li><li>✓ effect of steam quality on turbine operation</li><li>✓ standard operating procedures specific to power generation operations</li><li>✓ recording and reporting power generation processes and maintenance requirements.</li><li>✓ data used to evaluate power</li></ul>	<p>Skills to be developed:</p> <ul style="list-style-type: none"><li>✓ operate a power generation system within a pulp and paper manufacturing facility, at least twice in line with required enterprise intervals</li><li>✓ follow safe working practices when operating power generation system</li><li>✓ use electronic and other control systems to control equipment during operations</li><li>✓ communicate effectively, through written and verbal means, with others, in the work area when operating power generation system</li><li>✓ for each of the above operational periods, complete operating log and record processes and maintenance requirements.</li></ul>



generation system performance including: <ul style="list-style-type: none"><li>✓ heat and pressure levels</li><li>✓ energy generation levels</li><li>✓ heat build-up</li><li>✓ system overload information</li><li>✓ test outcomes for fuel</li></ul>	
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<b>UNIT TITLE</b> <b>Trouble shooting of control systems</b>				
<b>DESCRIPTOR</b>	This unit covers finding and rectifying faults in process control apparatus and systems. The unit encompasses safe working practices, interpreting process and circuit diagrams, applying knowledge of process controls to logical fault-finding procedures, conducting repairs, safety and functional testing and completing the necessary service documentation.			
<b>CODE</b>		<b>LEVEL</b>	III	<b>CREDIT</b>
				03

<b>ELEMENTS OF COMPETENCIES</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare to find and rectify faults.	1.1. OHS procedures for a given work area are identified, obtained and understood 1.2. OHS risk control measures and procedures are followed in preparation for the work. 1.3. The nature of the fault is obtained from documentation or from work supervisor to establish the scope of work to be undertaken. 1.4. Advice is sought from the work supervisor to ensure the work is coordinated effectively with others. 1.5. Sources of materials that may be required for the work are established in accordance with established procedures. 1.6. 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. Find faults.	2.1 OHS risk control measures and procedures for carrying out the work are followed. 2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures 2.3 Apparatus is checked as being isolated where necessary in strict accordance OHS requirements and procedures 2.4 Fault finding is approached methodically drawing on knowledge of industrial processes and control apparatus and systems using measured and calculated values of system parameters. 2.5 Apparatus components are dismantled where necessary and parts stored to protect them against loss or damage 2.6 Faulty components are rechecked and their fault status confirmed. 2.7 Unexpected situations are dealt with safely and with the approval of an authorised person. 2.8 Fault finding activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
3. Rectify fault.	3.1. OHS risk control measures and procedures for carrying out the work are followed. 3.2. Apparatus is checked as being isolated where

	<p>necessary in strict accordance OHS requirements and procedures</p> <p>3.3. Materials required to rectify faults are sourced and obtained in accordance with established procedures.</p> <p>3.4. Repairs are affected efficiently without damage to other components or apparatus and using sustainable energy principles.</p> <p>3.5. Effectiveness of the repair is tested in accordance with established procedures.</p> <p>3.6. Apparatus is reassembled, finally tested and prepared for return to customer.</p>
4. Completion and report fault finding and rectification activities	<p>4.1. OHS work completion risk control measures and procedures are followed.</p> <p>4.2. Work area is cleaned and made safe in accordance with established procedures.</p> <p>4.3. Written justification is made for repairs to apparatus.</p> <p>4.4. Work completion is documented and appropriate person(s) notified in accordance with established procedures</p>

### **RANGE STATEMENT**

This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

### **Tools and equipment required:**

It is imperative that prior to the assessment, students need to be supplied with All the relevant tools and equipment.

### **ASSESSMENT GUIDE**

#### **Forms of assessment**

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this competency standard.

#### **Critical aspects (for assessment)**

As part of the assessment planned for this unit, it is important that work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment.

#### **Assessment conditions**

It is imperative that prior to the assessment, students need to have access to the full range of equipment involved in integrated continuous manufacturing of power generation systems linked to the operation of the power plant and its associated equipment.

## UNDERPINNING KNOWLEDGE AND SKILLS

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<p>Knowledge to be learnt:</p> <ul style="list-style-type: none"> <li>✓ Basic relay circuits encompassing</li> <li>✓ Relay circuits and drawing</li> <li>✓ Remote STOP-START control</li> <li>✓ Time delay relays</li> <li>✓ Circuits using contactors</li> <li>✓ Jogging and interlocking</li> <li>✓ Control devices</li> </ul> <p>Programmable relays encompassing:</p> <ul style="list-style-type: none"> <li>✓ Three-phase induction motor</li> <li>✓ Three-phase induction motor starters- reduced voltage encompassing:</li> <li>✓ Three-phase induction motor reversal and braking encompassing</li> <li>✓ Three-phase induction motor speed control encompassing</li> <li>✓ Diagnosis and troubleshooting devices and</li> </ul>	<p>Skills to be developed:</p> <ul style="list-style-type: none"> <li>✓ Basic relay circuits encompassing</li> <li>✓ Relay circuits and drawing</li> <li>✓ Remote STOP-START control</li> <li>✓ Time delay relays</li> <li>✓ Circuits using contactors</li> <li>✓ Jogging and interlocking</li> <li>✓ Control devices</li> </ul> <p>Programmable relays encompassing:</p> <ul style="list-style-type: none"> <li>✓ Three-phase induction motor</li> <li>✓ Three-phase induction motor starters- reduced voltage encompassing:</li> <li>✓ Three-phase induction motor reversal and braking encompassing</li> <li>✓ Three-phase induction motor speed control encompassing</li> <li>✓ Diagnosis skills required for trouble shooting</li> </ul>