

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**SALT PROCESSING ARTISAN**

**LEVEL 4**



TVET CDACC

P.O. BOX 15745-00100

NAIROBI

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# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya’s development blue print and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted in the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that these National occupational Standards were developed for the purpose of developing a competency-based curriculum for Salt Processing Level 4. These Occupational Standards will also be the basis for assessment of an individual for competence certification.

It is my conviction that these National occupational Standards will play a great role towards development of competent human resource for the Mining sector’s growth and sustainable development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, “middle-income country providing a high-quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 and the emphasized the need to reform curriculum development, assessment and certification. This called for shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with Mining Sector Skills Advisory Committee (SSAC), have developed these National Occupational Standards for a Salt processing Artisan. These standards will be the basis for development of competency-based curriculum for Salt processing Level 4. These Standards will also be the basis for assessment of an individual for competence certification.

The occupational standards are designed and organized with clear performance criteria for each element of a unit of competency. These standards also outline the required knowledge and skills as well as evidence guide.

I am grateful to the Council Members, Council Secretariat, Mining SSAC, expert workers and all those who participated in the development of these occupational standards.

**CHAIRPERSON, TVET CDACC**

# ACKNOWLEDGEMENT

These Occupational Standards were developed through combined effort of various stakeholders from private and public organizations. I am sincerely thankful to the management of these organizations for allowing their staff to participate in this course. I wish to acknowledge the invaluable contribution of industry players who provided inputs towards the development of these Standards.

I thank TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) for providing guidance on the development of these Standards. My gratitude goes to the Mining Sector Skills Advisory Committee (SSAC) members for their contribution to the development of these Standards. I thank all the individuals and organizations who participated in the validation of these Standards.

I acknowledge all institutions which in one way or another contributed to the development of these Standards.

**CHAIRPERSON**

**MINING SECTOR SKILLS ADVISORY COMMITTEE**

Table of Contents

[FOREWORD i](#_Toc79353790)

[PREFACE ii](#_Toc79353791)

[ACKNOWLEDGEMENT iii](#_Toc79353792)

[ACRONYMNS AND ABBREVIATION v](#_Toc79353793)

[KEY TO UNIT CODE vi](#_Toc79353794)

[OVERVIEW vii](#_Toc79353795)

[BASIC UNITS OF COMPETENCY 1](#_Toc79353796)

[DEMONSTRATE COMMUNICATION SKILLS 2](#_Toc79353797)

[DEMONSTRATE NUMERACY SKILLS 6](#_Toc79353798)

[DEMONSTRATE DIGITAL LITERACY 12](#_Toc79353799)

[DEMONSTRATE ENTREPRENEURIAL SKILLS 16](#_Toc79353800)

[DEMONSTRATE EMPLOYABILITY SKILLS 21](#_Toc79353801)

[DEMONSTRATE ENVIRONMENTAL LITERACY 26](#_Toc79353802)

[DEMONSTRATE OCUPATIONAL SAFETY AND HEALTH PRACTICES 31](#_Toc79353803)

[COMMON UNITS OF COMPETENCY 36](#_Toc79353804)

[APPLY BASIC CHEMISTRY PRINCIPLES 37](#_Toc79353805)

[CORE UNITS OF COMPETENCY 43](#_Toc79353806)

[MAINTAIN SALT EVAPORATION PONDS 44](#_Toc79353807)

[PERFORM SALT WASHING OPERATIONS 48](#_Toc79353808)

[PERFORM SALT DRYING 52](#_Toc79353809)

[PERFORM SALT GRINDING 56](#_Toc79353810)

[PERFORM SALT PACKAGING 60](#_Toc79353811)

# ACRONYMNS AND ABBREVIATION

BC Basic Competency

CBET Competency Based Education and Training

CC Common Competency

CDACC Curriculum Development Assessment and Certification Council

CR Core Competency

CU Curriculum

EMCA Environmental Management and Coordination Act

KCSE Kenya Certificate of Secondary Education

KNQA Kenya National Qualifications Authority

MoE Ministry of Education

NGO Non-Governmental Organization

OS Occupational Standards

OSHA Occupation Safety and Health Act

PPE Personal Protective Equipment

SP Salt Processing

SSAC Sector Skills Advisory Committee

TVET CDACC TVET Curriculum Development Assessment and Certification Council

TVET Technical and Vocational Education and Training

# KEY TO UNIT CODE

 **MIN/OS /SP/BC/01/4 /A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

# OVERVIEW

Salt processing Level 4 qualification consists of competencies that a person must achieve to enable him/her to maintain salt evaporation ponds, perform salt washing operations; salt drying, salt grinding and salt packaging.

The units of competency comprising this qualification include the following basic, common and core competencies:

**Basic Units of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| MIN/OS/SP/BC/01/4/A | Demonstrate communication skills |
| MIN/OS/SP/BC/02/4/A | Demonstrate numeracy skills |
| MIN/OS/SP/BC/03/4/A | Demonstrate digital literacy |
| MIN/OS/SP/BC/04/4/A | Demonstrate entrepreneurial skills |
| MIN/OS/SP/BC/05/4/A | Demonstrate employability skills |
| MIN/OS/SP/BC/06/4/A | Demonstrate environmental literacy |
| MIN/OS/SP/BC/07/4/A | Demonstrate occupational safety and health practices |

**Common Units of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| MIN/OS/SP/CC/01/4/A | Apply basic chemistry principles |

**Core Units of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| MIN/OS/SP/CR/01/4/A | Maintain salt evaporation ponds  |
| MIN/OS/SP/CR/02/4/A | Perform salt washing operations  |
| MIN/OS/SP/CR/03/4/A | Perform salt drying  |
| MIN/OS/SP/CR/04/4/A | Perform salt grinding  |
| MIN/OS/SP/CR/05/4/A | Perform salt packaging  |

**BASIC UNITS OF COMPETENCY**

# DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** MIN/OS/SP/BC/01/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required demonstrate communication skills. It involvesobtaining and conveying workplace information, completing relevant work-related documents, communicating information about workplace processes, leading workplace discussion and communicating workplace issues.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Obtain and convey workplace information
 | 1. Specific and relevant information is accessed from ***appropriate sources*** based on standard procedures
2. Effective questioning, active listening and speaking skills are used to gather and convey information based on communication needs
3. Appropriate ***medium*** is used to transfer information and ideas in accordance with workplace guidelines
4. Appropriate non- verbal communication is used as per the communication needs
5. Appropriate lines of communicationwith supervisors and colleagues are identified and followed based on workplace requirements
6. Location and storage of information is undertaken according to workplace procedures
	1. Personal interaction is carried out clearly and concisely according to workplace requirements
 |
| 1. Complete relevant work-related documents
 | * 1. Range of forms relating to conditions of employment are completed according to workplace procedures
	2. Workplace data is recorded based on workplace requirements
	3. Errors in recording information are identified and acted upon in accordance with workplace policies
	4. Reporting requirements are completed according to organizational guidelines
 |
| 1. Communicate information about workplace processes
 | 1. Information sources are identified according to workplace procedures
2. ***Methods of communication*** are selected based on workplace guidelines
3. Multiple operations are communicated according to workplace structure
4. Work-related questions are asked and responded based on set protocols
5. Information is selected and organized according to workplace requirements
6. Verbal and written reporting is undertaken as per workplace requirements
7. Communication is maintained according to workplace standards
 |
| 1. Lead workplace discussions
 | 1. Response to workplace issues are sought and provided as per workplace protocol
2. Constructive contributions are made based on ***workplace discussions***
3. Workplace objectives and action plan are communicated according to workplace requirements
 |
| 1. Identify and communicate issues arising in the workplace
 | 1. Issues and problems are identified as per workplace guidelines
2. Problems and issues in the workplace are organized according to workplace operations
3. Dialogue is initiated with appropriate personnel as per workplace structure
4. Problems and issues raised are communicated as per the workplace reporting procedures
 |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Methods of communication mayinclude but not limited to:
 | * Non-verbal gestures
* Verbal
* Face to face
* Two-way radio
* Speaking to groups
* Using telephone
* Written
* Internet
 |
| 1. Workplace discussion may include but not limited to:
 | * Coordination meetings
* Toolbox discussion
* Peer-to-peer discussion
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Active listening
* Interpretation
* Negotiation
* Writing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Organization requirements for written and electronic communication methods
* Effective verbal communication methods
* Report writing
* Effective questioning techniques (clarifying and probing)
* Workplace etiquette

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate: 1. Dealt with a range of communication/information at one time
2. Made constructive contributions in workplace issues
3. Sought workplace issues effectively
4. Responded to workplace issues promptly
5. Presented information clearly and effectively in written form
6. Used appropriate sources of information
7. Asked appropriate questions
8. Provided accurate information
 |
| 1. Resource Implications
 | 1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
3. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | 1. Third-party reports
2. Portfolio
3. Interview
4. Written tests
5. Observation
6. Oral questioning
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On the job
2. Off the job
3. During industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# DEMONSTRATE NUMERACY SKILLS

**UNIT CODE:** MIN/OS/SP/BC/02/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate numeracy skills. It involves identifying and using whole numbers and simple fractions, decimals and percentages for work, identifying, measuring and estimating familiar quantities for work, reading and using familiar maps, plans and diagrams for work, identifying and describing common 2D and some 3D shapes for work, constructing simple tables and graphs for work using familiar data and identifying and interpreting information in familiar tables, graphs and charts for work

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range.*** |
| 1. Identify and use whole numbers and simple fractions, decimals and percentages for work
 | 1. Simple fractions, decimals and percentages identified and interpreted as per standard operating procedures.
2. Understanding of place value by organising numbers from smallest to largest demonstrated as SOPs
3. Required numerical information located and decision made on appropriate method to solve a problem as per SOPs
4. Limited range of calculations performed using the four operations using SOPs
5. Links between operations described as per SOPs
6. Estimations made to check reasonableness of results of problem-solving process as SOPs
7. Numerical information recorded, and the result of the task communicated using informal and some formal language and symbolism as per workplace procedures
 |
| 1. Identify, measure and estimate familiar quantities for work
 | 1. Measurement information in workplace tasks and texts identified and interpreted as per workplace procedures.
2. Familiar units of measurement needed for tasks is identified as per measurements manuals/charts
3. Familiar and simple amounts estimated as per workplace procedures.
4. Appropriate measuring equipment selected as per SOPs
5. ***Simple measuring equipment*** graduated in familiar units to measure relevant quantities is used as per graduation manuals.
6. Calculation done using familiar units of measurement as per SOPs
7. Measurements and results checked against estimates as per job specifications.
8. Results are recorded or reported as per workplace procedures
9. Results relevant to the workplace task are communicated using informal and some formal mathematical and general language as per workplace procedures.
 |
| 1. Read and use familiar maps, plans and diagrams for work
 | 1. Items and places are in familiar maps, plans and diagrams as per SOPs
2. Common symbols and keys recognised in familiar maps, plans and diagrams as per SOPs
3. Understanding of direction and location demonstrated by describing the location of objects, or route to familiar places as per SOPs
4. Instructions to locate familiar objects or places are given and followed as per SOPs
5. Informal and some formal oral mathematical language and symbols are used as per SOPs
 |
| 1. Identify and describe common 2D and some 3D shapes for work
 | 1. ***Common 2D shapes and some common 3D shapes*** in familiar situations are identified and named as per job requirements
2. Common 2D shapes and designs are compared and classified as per SOPs
3. Informal and some formal language used to describe common two-dimensional shapes and some common three-dimensional shapes in accordance with workplace procedures.
4. Simple items used to draw or construct common 2D shapes as per workplace procedures.
5. Common 3D shapes matched to their 2D sketches or nets as per SOPs
 |
| 1. Construct simple tables and graphs for work using familiar data
 | 1. Common types of graphs are identified and named as per SOPs
2. Familiar data to be collected is determined in accordance with job specifications.
3. A method to collect data is selected in accordance with workplace procedures.
4. A small amount of simple familiar data is collected as per workplace procedures
5. One or two variables determined from the data collected as per SOPs.
6. Data ordered and collated as per standard operating procedures.
7. A table is constructed and data entered as per SOPs
8. Graphs are constructed using data from table as per job specifications
9. Results are promptly checked as per workplace procedures
10. Graph information related to work is reported or discussed using informal and some formal mathematical and general language as per workplace procedures
 |
| 1. Identify and interpret information in familiar tables, graphs and charts for work
 | 1. Simple tables are identified in familiar texts and contexts in accordance with workplace procedures
2. Title, headings, rows and columns located in familiar tables as per SOPs
3. Information and data in simple tables identified and interpreted as per workplace procedures.
4. Information is related in accordance with workplace tasks
5. Familiar graphs and charts are identified in familiar texts and contexts as per SOPs
6. Title, labels, axes, scale and key from familiar graphs and charts are located as per SOPs
7. Information and data in familiar graphs and charts are identified and interpreted as per job requirements
8. Information is related to relevant workplace tasks as per job requirements.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Simple measuring equipment may include but not limited to:
 | * Rulers
* Watches/clocks
* Scales
* Thermometers
* AVO meter
 |
| 1. Common 2D shapes and common 3D shapes may include but not limited to:
 | * Round
* Square
* Rectangular
* Triangle
* Sphere
* Cylinder
* Cube
* Polygons
* Cuboids
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Measuring
* Logical thinking
* Computing
* Drawing of graphs
* Applying mathematical formulas
* Analytical

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Types of common shapes
* Differentiation between two dimensional shapes / objects
* Formulae for calculating area and volume
* Types and purpose of measuring instruments
* Units of measurement and abbreviations
* Fundamental operations (addition, subtraction, division, multiplication)
* Rounding techniques
* Types of fractions
* Different types of tables and graphs
* Meaning of graphs, such as increasing, decreasing, and constant value
* Preparation of basic data, tables & graphs

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Simple fractions, decimals and percentages are correctly identified and interpreted
	2. Performed a limited range of calculations using the 4 operations
	3. Performed calculations using familiar units of measurement
	4. Recognised common symbols and keys in familiar maps, plans and diagrams
	5. Constructed simple tables and graphs using familiar data
	6. Identified and interpret information in familiar tables, graphs and charts
 |
| 1. Resource Implications
 | 1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
3. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency may be assessed through:1. Written Test
2. Interview
3. Oral Questioning
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On the job
2. Off the job
3. During industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# DEMONSTRATE DIGITAL LITERACY

**UNIT CODE:** MIN/OS/SP/BC/03/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate digital literacy in a working environment. It entails identifying computer software and hardware, applying security measures to data, hardware, software, applying computer software in solving task sand applying internet and email in communication at workplace.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Identify computer software and hardware
 | * 1. ***Appropriate computer software*** is identified according to manufacturer’s specification
	2. ***Appropriate computer hardware*** is identified according to manufacturer’s specification
 |
| 1. Apply security measures to data, hardware, software
 | * 1. ***Data security and privacy are classified*** in accordance with the technological situation
	2. ***Security and control measures*** are applied in accordance with laws governing protection of ICT
	3. Computer threats and crimes are detected as per information security management guidelines.
	4. Protection against computer crimes is undertaken in accordance with laws governing protection of ICT
 |
| 1. Apply computer software in solving tasks
 | * 1. Basic word processing concepts are applied in resolving workplace tasks
	2. Word processing utilities are applied in accordance with workplace procedures
	3. Data is manipulated on worksheet in accordance with office procedures
 |
| 1. Apply internet and email in communication at workplace
 | * 1. Electronic mail is applied in workplace communication in accordance with office procedures
	2. Office internet functions are defined and executed in accordance with office procedures
	3. Network configuration and uses are determined in accordance with office operations procedures
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Range** | **Variable** |
| 1. Appropriate computer software may include but not limited to:
 | * Operating system
* MS office
* Web browser
* Media players
 |
| 1. Appropriate computer hardware may include but not limited to:
 | * Computer Case
* Monitor
* Keyboard
* Mouse
* Hard Disk Drive
* Motherboard
* Video Card
 |
| 1. Data security and privacy may include but not limited to:
 | * Confidentiality
* Cloud computing
* Confidentiality
* Cyber terrorism
* Integrity -but-curious data serving
 |
| 1. Security and control measures may include but not limited to:
 | * Countermeasures and risk reduction
* Cyber threat issues
* Risk management
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Analytical
* Interpretation
* Typing
* Communication
* Computing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Input and output devices
* Central processing Unit (CPU)
* Peripherals
* Storage Media
* Software concept
* Types of concept
* Function of computer software
* Data security and privacy
* Security threats and control measures
* Computer crimes
* Detection and protection of computer crimes
* Laws governing protection of ICT
* Word processing;
* Functions and concepts of word processing.
* Documents and tables creation and manipulations
* Mail merging
* Word processing utilities
* Spread sheet;
* Meaning, formulae, function and charts, uses, layout, data manipulation and application to cell
* Networking and Internet;
* Meaning, functions and uses of networking and internet.
* Electronic mail and world wide web
* Emerging trends and issues in ICT;
* Identify and apply emerging trends and issues in ICT
* Challenges posed by emerging trends and issues

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Identified input, output, CPU and storage media devices of computers in accordance to computer specification
	2. Identified concepts, types and functions of computer software according to operation manual
	3. Identified and controlled security threats
	4. Detected and protected computer crimes
	5. Applied word processing in office tasks
	6. Prepared work sheet and applied data to the cells in accordance to workplace procedures
	7. Used Electronic Mail for office communication as per workplace procedure
	8. Applied internet and World Wide Web for office tasks in accordance with office procedures
	9. Applied laws governing protection of ICT
 |
| 1. Resource Implications
 | * 1. Access to relevant workplace where assessment can take place
	2. Appropriately simulated environment where assessment can take place
	3. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Written tests
	2. Practical assignment
	3. Interview
	4. Oral Questioning
	5. Observation
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On the job
2. Off the job
3. During industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# DEMONSTRATE ENTREPRENEURIAL SKILLS

**UNIT CODE:** MIN/OS/SP/BC/04/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required demonstrate entrepreneurial skills. It involvescreating and maintaining small scale business, establishing small scale business customer base, managing small scale business and growing/ expanding small scale business.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the **key outcomes** which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Create and maintain small scale business
 | 1. Generation and evaluation of business ideas is undertaken in accordance with the existing procedure
2. Competencies are matched with business opportunities in accordance with business practices.
3. Procedure for starting a small business is identified as per the legal requirements
4. SWOT/ PESTEL analysis and or industrial survey is carried out according to office procedures
5. ***Business operations*** are monitored and controlled following established procedures.
6. Quality assurance measures are implemented in accordance with the business practices.
7. Good relations are maintained with staff/workers as per the workplace policies.
8. Policies and procedures on occupational safety and health and environmental concerns are constantly observed as per the workplace policies
 |
| 1. Establish small scale business customer base
 | 1. Good customer relations are maintained in accordance with office procedures
2. New customers and markets are identified, explored and reached out to according to the marketing plan
3. Promotions/Incentives are offered to loyal customers in accordance with office procedures
4. Additional products and services are evaluated and tried in accordance with marketing strategy
5. Customer record is maintained in accordance with office procedures
 |
| 1. Manage small scale business
 | 1. Enterprise is built up and sustained in line with judicious control of cash flows.
2. Profitability of enterprise is ensured as per the internal controls.
3. Unnecessary or lower-priority expenses and purchases are avoided as per the marketing strategy
4. Basic cost-benefit analysis are undertaken in accordance with office procedures
5. Basic financial management are undertaken in accordance with office procedures
6. Basic financial accounting in undertaken in accordance with office procedures
7. Business ***internal controls*** are implemented in accordance with office procedure
8. Setting business priorities and strategies is carried out according to office procedures
9. Preparation and interpretation of basic financial statements is undertaken in accordance with set procedures
10. Preparation of business plansfor small business is undertaken in accordance with ***business strategy***
11. Business Social Responsibility is maintained in accordance with Standard Operations Procedures (SOP)
 |
| 1. Grow/ expand small scale business
 | 1. Prepared business growth strategy for small sale business in accordance with office procedures
2. Incorporated technology in small scale business growth in accordance with technological trends
3. Emerging issues and trends are considered in accordance with business growth strategy
4. Built audience interest in product/service according to growth strategy
5. Boosted cooperate communication according to business ***communication strategy***
 |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range**  |
| 1. Business operations may include but not limited to:
 | * Purchasing
* Accounting/administrative
* Work production/operations/sales
* Marketing
 |
| 1. Internal control may include but not limited to:
 | * Accounting systems
* Financial statements/reports
* Cash management
* Human resource management
 |
| 1. Business Strategy may include but not limited to:
 | * Management of wastages
* Environmental Conservation
 |
| 1. Communication strategy may include but not limited to:
 | * Blue print of exchange of information
* Technology and exchange of information
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Marketing
* Advertising
* Basic bookkeeping
* Accounting
* Communication

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Generation and evaluation of business ideas
* Legal requirements for starting a small business
* SWOT/ PESTEL analysis
* Occupational Safety and Health
* Public relations concepts
* Business plan
* Business financing
* Marketing strategies
* Business management and control
* Production/ operation process
* Product promotion strategies
* Market and feasibility studies
* Business ethics
* Building customer relations
* Business models and strategies
* Types and categories of businesses
* Business internal controls
* Relevant national and local legislation and regulations
* Basic quality control and assurance concepts
* Building relations with customer and employees
* Building competitive advantage of the enterprise
* Business growth strategies

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |  |
| --- | --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:

|  |
| --- |
| 1. Demonstrated entrepreneurial skills
2. Demonstrate competencies to create a small-scale business
3. Demonstrated ability to conceptualize and plan a micro/small business
4. Grew customer base for the small-scale business
5. Demonstrated ability to manage/operate a micro/small-scale business
6. Demonstrated competencies to grow a micro/small-scale business
 |

 |
| 1. Resource Implications
 |

|  |
| --- |
| The following resources should be provided:  |

1. Assessment location
2. Case studies on micro/small-scale enterprises
3. Assessment materials
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:

|  |  |
| --- | --- |
| 1. Written tests
2. Observation
3. Oral questioning
4. Portfolio
5. Projects
 |  |

 |
| 1. Context of Assessment
 | Competency may be assessed 1. On the job
2. Off the job
3. During industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# DEMONSTRATE EMPLOYABILITY SKILLS

**UNIT CODE:** MIN/OS/SP/BC/05/4/A

**UNIT DESCRIPTON**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating critical safe work habits, demonstrating workplace learning and workplace ethics.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Conduct self-management
 | 1. Personal vision, mission and goals are formulated based on potential and in relation to organization objectives
2. Emotional intelligence is demonstrated as per workplace requirements.
3. Individual performance is evaluated and monitored according to the agreed targets.
4. Assertiveness is developed and maintained based on the requirements of the job.
5. Accountability and responsibility for own actions are demonstrated based on workplace instructions.
6. Self-esteem and a positive self-image are developed and maintained based on values.
7. Time management, attendance and punctuality are observed as per the organization policy.
8. Goals are managed as per the organization’s objective
9. Self-strengths and weaknesses are identified based on personal objectives
 |
| 1. Demonstrate critical safe work habits
 | 1. Stress is managed in accordance with workplace policy.
2. Punctuality and time consciousness is demonstrated in line with workplace policy.
3. Personal objectives are integrated with organization goals based on organization’s strategic plan.
4. ***Resources*** are utilized in accordance with workplace policy.
5. Work priorities are set in accordance to workplace goals and objectives.
6. Leisure time is recognized and utilized in line with personal objectives.
7. ***Drugs and substances of abuse*** are identified and avoided based on workplace policy.
8. HIV and AIDS prevention awareness is demonstrated in line with workplace policy.
9. Safety consciousness is demonstrated in the workplace based on organization safety policy.
10. ***Emerging issues*** are identified and dealt with in accordance with organization policy.
 |
| 1. Demonstrate workplace learning
 | * 1. Learning opportunities are sought and managed based on job requirement and organization policy.
	2. Improvement in performance is demonstrated based on courses attended.
	3. Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job
	4. Time and effort is invested in learning new skills based on job requirements
	5. Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy.
	6. New systems are developed and maintained in accordance with the requirements of the job.
	7. Awareness of personal role in workplace ***innovation*** is demonstrated based on requirements of the job.
 |
| 1. Demonstrate workplace ethics
 | 1. Policies and guidelines are observed as per the workplace requirements
2. Self-worth and professionalism is exercised in line with personal goals and organizational policies
3. Code of conduct is observed as per the workplace requirements
4. Integrity is demonstrated as per legal requirement
 |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Range** | **Variable** |
| 1. Personal objectives may include but not limited to:
 | * Long term
* Short term
* Broad
* Specific
 |
| 1. Feedback may include but not limited to:
 | * Verbal
* Written
* Informal
* Formal
 |
| 1. Team may include but not limited to:
 | * Small work group
* Staff in a section/department
* Inter-agency group
 |
| 1. Drug and substance abuse may include but not limited to:
 | * Alcohol
* Tobacco
* Miraa
* Over-the-counter drugs
* Cocaine
* Bhang
* Glue
 |
| 1. Emerging issues may include but not limited to:
 | * Terrorism
* Social media
* National cohesion
* Open offices
 |
| 1. Range of media for learning may include but not limited to:
 | * Mentoring
* peer support and networking
* IT and courses
 |
| 1. Innovation may include but not limited to:
 | * New ideas
* Original ideas
* Different ideas
* Methods/procedures
* Processes
* New tools
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Interpersonal
* Critical thinking
* Observation
* Organizing
* Record keeping
* Problem solving
* Decision Making
* Resource utilization

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Work values and ethics
* Company policies
* Company operations, procedures and standards
* Occupational Health and safety procedures
* Fundamental rights at work
* Personal hygiene practices
* Workplace communication
* Concept of time
* Time management
* Decision making
* Types of resources
* Work planning
* Record keeping
* Workplace problems and how to deal with them
* Assertiveness
* Team work
* HIV and AIDS
* Drug and substance abuse
* Safe work habits
* Professional growth and development
* Technology in the workplace
* Emerging issues
	+ Social media
	+ Terrorism
	+ National cohesion

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Conducted self-management
	2. Demonstrated critical safe work habits
	3. Demonstrated workplace learning
	4. Demonstrated workplace ethics
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Portfolio of evidence
3. Third Party Reports
4. Written tests
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# DEMONSTRATE ENVIRONMENTAL LITERACY

**UNIT CODE:** MIN/OS/SP/BC/06/4/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate environmental literacy. It involves controlling environmental hazard, controlling environmental pollution, demonstrating sustainable resource use and evaluating current practices in relation to resource usage.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Control environmental hazard
 | * 1. Storage methods for environmentally hazardous materials are followed according to environmental regulations and OSHS.
	2. Disposal methods of hazardous wastes are followed according to environmental regulations and OSHS.
	3. ***PPE*** is used according to OSHS.
 |
| 1. Control environmental pollution
 | * 1. ***Environmental pollution*** ***control measures*** are compiled following standard protocol.
	2. Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999
	3. Methods for minimizing noise pollution complied following environmental regulations.
 |
| 1. Demonstrate sustainable use of resource s
 | * 1. Methods for minimizing wastage are complied with.
	2. ***Waste management procedures*** are employed following principles of 3Rs (Reduce, Reuse, Recycle)
	3. Methods for economizing or reducing resource consumption are practiced.
 |
| 1. Evaluate current practices in relation to resource usage
 | * 1. Information on resource efficiency ***systems and procedures*** are collected and provided as per work groups/sector
	2. ***Current resource usage*** is measured and recorded as per work group/sector
	3. Current purchasing strategies are analyzed and recorded according to industry procedures.
	4. Current work processes to access information and data is analyzed following enterprise protocol.
 |
| 1. 5. Identify environmental legislations/conventions for environmental concerns
 | 1. Environmental legislations/conventions and local ordinances are identified according to the different environmental aspects/impact
2. Industrial standard/environmental practices are described according to the different environmental concerns
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. PPE may include but are not limited to:
 | * Masks
* Gloves
* Goggles
* Safety hat
* Overall
* Hearing protector
* Safety boots
 |
| 1. Environmental pollution control measures may include but are not limited to:
 | * Methods for minimizing or stopping spread and ingestion of airborne particles
* Methods for minimizing or stopping spread and inhaling gases and fumes
* Methods for minimizing or stopping spread and ingestion of liquid wastes
 |
| 1. Waste management procedures may include but are not limited to:
 | * Sorting
* Storing of items
* Recycling of items
* Disposal of items
* Handling
* Transport
 |
| 1. Current resources usage may include but are not limited to:
 | * Electric
* Water
* Fuel
* Telecommunications
* Supplies
* Materials
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Measuring
* Recording
* Analytical
* Monitoring
* Writing
* Communication

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Storage methods of environmentally hazardous materials
* Disposal methods of hazardous wastes
* Usage of PPE Environmental regulations
* OSHS
* Types of pollution
* Environmental pollution control measures
* Different solid wastes
* Solid waste management
* Different noise pollution
* Methods of minimizing noise pollution
* Solid Waste Act
* Methods of minimizing wastage
* Waste management procedures
* Economizing of resource consumption
* Principle of 3Rs
* Types of resources
* Techniques in measuring current usage of resources
* Calculating current usage of resources
* Types of workplace environmental hazards
* Environmental regulations
* Environmental regulations applying to the enterprise.
* Procedures for assessing compliance with environmental regulations.
* Collection of information on environmental and resource efficiency systems and procedures,
* Measurement and recording of current resource usage
* Analysis and recording of current purchasing strategies.
* Analysis current work processes to access information and data Analysis of data and information

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Controlled environmental hazards
2. Controlled environmental pollution
3. Demonstrated sustainable resource use
4. Evaluated current practices in relation to resource usage
 |
| 1. Resource Implications
 | The following resources should be provided:* 1. Workplace with storage facilities
	2. Tools, materials and equipment relevant to the tasks (e.g. cleaning tools, cleaning materials, trash bags, etc.)
	3. PPEs
	4. Manuals and references
	5. Legislation, policies, procedures, protocols and local ordinances relating to environmental protection
	6. Case studies/scenarios relating to environmental Protection
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:1. Observation
2. Oral questioning
3. Written tests
4. Third party reports
5. Portfolio
 |
| 1. Context of Assessment
 | Competency may be assessed1. On the job
2. Off the job
3. During industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# DEMONSTRATE OCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** MIN/OS/SP/BC/07/4/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to practice safety and health and comply with OSH requirements relevant to work. It involves observing workplace procedures for hazards and risk prevention and participating in arrangements for workplace safety and health maintenance.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Adhere to workplace procedures for hazards and risk prevention
 | 1. Arrangement of work area and items in accordance with

workplace procedures requirements 1. Work standards and procedures are followed based on instructions
2. ***Prevention and control measures*** are applied based on instructions
 |
| 1. Participate in arrangements for workplace safety and health maintenance
 | 1. Orientations on ***OSH requirements and regulations*** is undertaken in line with policy.
2. Feedback on occupational health and safety are provided as per workplace instructions.
3. Workplace procedures for reporting hazards, incidents, injuries and sickness are adhered to as per workplace policy.
4. ***OSH-related training needs*** are identified and proposed as per workplace policy.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Prevention and control measures may include but are not limited to:
 | * Eliminate the hazard
* Isolate the hazard
* Substitute the hazard with a safer alternative
* Use administrative controls to reduce the risk
* Use engineering controls to reduce the risk
* Use personal protective equipment
* Safety, Health and Work Environment Evaluation
* Periodic and/or special medical examinations of workers
 |
| 1. Safety gears /PPE (Personal Protective Equipment’s) may include but are not limited to:
 | * Arm/Hand guard, gloves
* Eye protection (goggles, shield)
* Hearing protection (ear muffs, ear plugs)
* Hair Net/cap/bonnet
* Hard hat
* Face protection (mask, shield)
* Apron/Gown/coverall/jump suit
* Anti-static suits
* High-visibility reflective vest
 |
| 1. Incidents and emergencies may include but are not limited to:
 | * Chemical spills
* Equipment/vehicle accidents
* Explosion
* Fire
* Gas leak
* Injury to personnel
* Structural collapse
* Toxic and/or flammable vapors emission.
 |
| 1. OSH requirements / regulations may include but are not limited to:
 | * Building code
* Permit to Operate
 |
| 1. OSH-related trainings may include but are not limited to:
 | * Safety Orientations relevant to tasks
* Safe and Correct Operation of Tools and Equipment
* Health Orientations/trainings
* Prevention and Control of OSH Hazards in the workplace
* Chemical Handling
* Safety Trainings
* Prevention and Control of Work-related Injuries and Illness
* Basic First-aid Trainings
* Emergency Response Trainings
* Trainings on use of fire-extinguisher
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Knowledge management
* Collaborating
* Interpersonal
* Troubleshooting
* Critical thinking
* Observation

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* General OSH principles and legislations
* Principles of good housekeeping (5S)
* Company/workplace policies/ guidelines
* Standards and safety requirements of work process and procedures
* Standard Workplace emergency plan and procedures
* Safety and health requirements of tasks
* Workplace guidelines on providing feedback on OSH and security concerns
* OSH regulations
* Hazard control procedures
* OSH trainings relevant to work

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | 1. Assessment requires evidence that the candidate:
2. Arranged work area and items in accordance with
3. workplace procedures requirements
4. Followed work standards and procedures based on instructions
5. Applied ***Prevention and control measures*** based on instructions
6. Undertook orientations on ***OSH requirements and regulations*** in line with policy.
7. Provided feedback on occupational health and safety as per workplace instructions.
8. Adhered to workplace procedures for reporting hazards, incidents, injuries and sickness to as per workplace policy.
9. Identified and proposed ***OSH-related training needs*** as per workplace policy.
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Portfolio of evidence
3. Third Party Reports
4. Written tests
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# COMMON UNITS OF COMPETENCY

# APPLY BASIC CHEMISTRY PRINCIPLES

**UNIT CODE:** MIN/OS/SP/CC/01/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required to apply basic chemistry principles. It involves applying inorganic chemistry, basic physical chemistry and basic analytical chemistry.

This standard applies in the extractives sector

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  | **PERFORMANCE CRITERIA*****(Bold and italicised terms are elaborated in the Range)*** |
| --- | --- |
| 1. Apply basic inorganic chemistry
 | 1.1 ***Elements*** and their properties are reviewed based on their structure.1.2 The particulate nature of matter is introduced based on kinetic theory.1.3 ***Isotopes*** are introduced based on their stability and their radiogenic properties. 1.4 Atoms are introduced in terms of structure and bonding. 1.5 The periodic table is introduced as per groups and periods. 1.6 ***Transition elements*** are introduced based on their physical properties and uses.1.7 ***Minerals and Ores*** are introduced in terms of their importance and extraction techniques.1.8 Nuclear chemistry is introduced in terms of energy of the nuclear, radioactivity and their applications.  |
| 1. Apply basic physical chemistry
 | * 1. Phase equilibrium of elements is introduced in terms of physical, chemical and homogeneity properties.
	2. ***Acids and bases*** are introduced based on their definition, reactions, classification and their properties.
	3. Reduction and Oxidation reactions are introduced in terms their potentials and conditions.
	4. Aqueous chemistry is introduced in terms of equilibrium and chemical reactivity.
 |
| 1. Apply basic analytical chemistry
 | 4.1 Chemical separation is explored in terms of ***separation techniques***, composition and purpose of separation.4.2 ***Chemical analytical techniques*** are used to analyse bulk sample composition based on the purpose. |

RANGE

| **Variable** | **Range** |
| --- | --- |
| * Organic compounds may include but is not limited to:
 | * Hydrocarbons
* Alkylhalides
* Aromatic compounds
* Hydroxyl compounds/ alcohol
* Carbonyl compounds
* Carboxylic acids
* Esters
* Organo-nitrogen compounds
* Polymers
 |
| * Geochemical properties may include but is not limited to:
 | * Acid-base properties
* Adsorption
* Absorption
* Separation
 |
| * Organic minerals may include but is not limited to:
 | * Coal
* Oil
* Hydrocarbon gas
 |
| * Elements include but not limited to:
 | * Hydrogen
* Oxygen
* Sodium
* Nitrogen
* Methane
 |
| * Isotopes include but not limited to:
 | * Oxygen- 16, 17, 18
* Carbon -12, 13,14
* Uranim- 235,238
* Hydrogen - 2, 1 ,3
 |
| * Transition elements include but not limited to:
 | * Iron
* Copper
* Chromium
* Manganese
* Vanadium
* Titanium
* Nickel
 |
| * Minerals may include but not limited to:
 | * Quartz (Silica)
* Calcite
* Phlogopite
* Sillimanite
* Andalusite
* Magnetite
* Apatite
 |
| * Ores may include but not limited to:
 | * magnetite
* corundum
* Magnesium
* galena
* malachite
 |
| * Acids and bases include but not limited to:
 | * Acids :
* Organic
* Inorganic
* Bases:
* Soluble
* insoluble
 |
| * Chemical separation techniques may include but limited to:
 | * Chromatography
* Froth flotation
* Metal leaching
* Fractional distillation
* Electrophoresis
* Electrolysis
* Electro-chromatography

  |
| * Chemical analytical techniques may include but limited to:
 | * Atomic Absorption Spectrometry (AAS)
* X-ray florescence ( XRF)
* Infra red spectroscopy (IR)
* X-ray diffraction (XRD)
* Calorimetry
* Carbon analyser
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required skills**

The individual needs to demonstrate the following skills:

* Report writing
* Lab practice
* Communication
* Interpersonal
* Critical thinking
* Problem solving
* Logical thinking
* Organizational

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Elements and their properties
* The particulate nature of matter
* Isotopes
* Atoms
* The periodic table
* Transition elements
* Minerals and Ores
* Nuclear chemistry
* Organic compounds
* Distribution of organic compounds
* Geochemical properties of organic compounds
* Organic minerals
* Phase equilibrium of elements
* Acids and bases
* Reduction and Oxidation reactions
* Aqueous chemistry
* Chemical separation
* Chemical analytical techniques

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate: 1.1 Demonstrated basic understanding of:* The periodic table
* Elements and their properties
* The particulate nature of matter
* Isotopes
* Atoms
* Crystal system
* The periodic table
* Transition elements
* Minerals and Ores
* Nuclear chemistry
* Organic compounds
* Distribution of organic compounds
* Geochemical properties of organic compounds
* Organic minerals
* Phase equilibrium of elements
* Acids and bases
* Reduction and Oxidation reactions
* Aqueous chemistry
* Chemical separation
* Chemical analytical techniques

1.2 Demonstrated ability to:* Prepare solutions
* Standardize solutions
* Electroplate materials
* Prepare crystals
* Separate chemicals
* Identify organic compounds and minerals
* Prepare Organic compounds
* Liquefy gases
* Perform fractional distillation
* Perform titration
* Analyze chemical reactions
* Identify ionic and covalent bond
 |
| 1. Resource Implications
 | The following resources should be provided: * 1. Access to relevant workplace or appropriately simulated environment where assessment can take place

2.2 Laboratory 2.3 Relevant reagents 2.4 Relevant apparatus2.5 Relevant chemicals |
| 1. Methods of Assessment
 | Competency may be assessed through:1. Observation
2. Written tests
3. Practical’s
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the- job
2. Off-the-job
3. Workplace experience

  |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# CORE UNITS OF COMPETENCY

# MAINTAIN SALT EVAPORATION PONDS

**UNIT CODE:** MIN/OS/SP/CR/01/4/A

**UNIT DESCRIPTION**

This unit specifies competencies required to maintain salt evaporation ponds. It entails scheduling brine flow, maintaining pond gradient, collecting fluid samples and harvesting crystallized salt.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**These describe the keyoutcomes which make upworkplace function | **PERFORMANCE CRITERIA*****(Bold and italicized terms are elaborated in the Range)*** |
| --- | --- |
| 1. Schedule brine flow
 | * 1. ***Impurities and insolubles*** in brine are identified based on brine chemical composition and geological data.
	2. Settling time is decided based on brine physical properties.
	3. Sequential brine flow is established based on pond order.
	4. Crystallization time of brine is established based on meteorological data.
 |
| 1. Maintain pond gradient
 | * 1. Pond depth is established based on direction of flow.
	2. Siltation is assessed based on control points.
	3. Brine flow is monitored based on pond gradient.
	4. Original gradient is recovered based on siltation level, pond gradient and organization procedures.
 |
| 1. Collect fluid samples
 | * 1. Sample points are identified based on pond gradient and organizational procedures.
	2. Fluid samples are collected based on organizational procedures and sample points.
	3. Fluid sample information is recorded based on organizational procedures.
 |
| 1. Harvest crystallized salt
 | * 1. Harvesting equipment are identified and obtained based on job requirements.
	2. Harvesting equipment are assigned based on task requirements
	3. Harvesting personnel is identified and assigned based on task requirements.
	4. Volume of salt is estimated based on best practice
	5. Crystallized salt is harvested based on equipment and harvesting methods.
	6. Harvested salt is loaded on a haulage equipment based on capacity and distance to the processing plant.
	7. Daily pond activities are documented based on organizational procedures.
	8. Pond records are maintained based on organizational procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range*****May include but is not limited to:*** |
| Harvesting equipment may include but not limited to: | * Tractors
* Shovel
* Spade
* Loaders
 |
| Impurities and insolubles may include but not limited to: | * Calcium carbonate
* Calcium sulphate
* Magnesium chloride
* Magnesium sulphate
* Magnesium bromide
* Clay
* Sand

Fauna and flora and their decomposition products  |
| Haulage equipment may include but not limited to: | * Conveyors
* Trucks
* Trains
 |

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of loading and hauling equipment
* Harvesting equipment
* Pond gradients
* Salt impurities, soluble and insoluble
* Crystallization
* Phases of matter
* Siltation
* Brine flow
* Basic chemistry
* Basic geology
* Sources of salt
* Application of salt

**Required Skills**

The individual needs to demonstrate the following skills:

* Operating harvesting equipment
* Record keeping
* Salt harvesting
* Ability to collect samples
* Desilting of ponds
* Depth measurement

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Identified salt impurities and insoluble.
	2. Measured pond depth.
	3. Maintained pond gradient.
	4. Established crystallization time.
	5. Collected fluid samples.
	6. Recorded fluid samples information.
	7. Harvested crystallized salt.
	8. Identified harvesting equipment.
	9. Observed EHS procedures.
	10. Used PPEs.
	11. Maintained pond records
 |
| 1. Resource implications
 | ***The following resources must be provided:**** 1. PPEs
	2. Shovels
	3. Spades
	4. Loaders
	5. Tractors
	6. Trucks
	7. Measuring equipment
	8. Reference materials
	9. Computers
	10. Internet connectivity
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written tests
	4. Practical’s
	5. Third party report
 |
| 1. Context of assessment
 | Candidate will be assessed individually in an actualWorkplace or in closely simulated work environment. |
| 1. Guidance information for assessment.
 | This unit may be assessed on an integrated basis with others withinthis occupational sector. |

# PERFORM SALT WASHING OPERATIONS

**UNIT CODE:** MIN/OS/SP/CR/02/4/A

**UNIT DESCRIPTION**

This unit specifies competencies required to perform salt washing operations. It entails conducting concentrated brine salt washing, conducting fresh water salt washing, operating and maintaining salt washing equipment and collecting salt samples.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the keyoutcomes which make upworkplace function | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the Range)*** |
| 1. Conduct concentrated brine salt washing
 | * 1. ***Washing equipment*** is identified and obtained based on task requirements.
	2. Brine concentration is established based on salt solubility and washing technique.
	3. Salt is washed with concentrated brine based on SOPs
	4. Safety procedures are observed based on task and OSHA requirements.
	5. Brine is safely discharged based on organizational procedures and NEMA regulations.
 |
| 1. Conduct fresh water salt washing
 | * 1. Washing equipment is identified and obtained based on task requirements.
	2. Salt is washed with fresh water based on standard operating procedures
	3. Safety procedures are observed based on task requirements and OSHA requirements.
	4. Waste water is safely discharged based on organizational procedures and NEMA regulations.
 |
| 1. Operate and maintain salt washing equipment
 | * 1. Salt washing equipment is identified and obtained based on task requirement.
	2. Salt washing equipment is operated based on manufacturer’s specification.
	3. Salt washing equipment is monitored and assessed for ***defects*** based on manufacturer’s specifications.
	4. Salt washing equipment is maintained based on manufacturer’s specifications and organizational procedures.
 |
| 1. Collect salt samples
 | * 1. Sample points are identified based on standard operating procedures.
	2. Salt samples are collected based on organizational procedures.
	3. Salt sample information is recorded based on organizational procedure.
	4. salt database is created and maintained based on organisational procedures
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

| **Variable** | **Range** |
| --- | --- |
| 1. Washing equipment may include but not limited to:
 | * Spiral classifier
* Cyclones
* Storage tank
 |
| 1. Defects may include but not limited to:
 | * Electrical faults
* Worn out parts
* Misaligned tighteners
* Leakages
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Types of washing equipment
* Salt impurities, soluble and insolubles
* Crystallization
* Phases of matter
* Brine flow
* Salt washing
* Basic chemistry
* Sources of salt
* Application of salt
* Basic machine operations

**Required skills**

The individual needs to demonstrate the following skills:

* Ability to operate washing equipment
* Salt washing
* Collecting salt samples
* Record keeping
* Communication
* Ability to use PPEs
* Problem solving
* Observation

**EVIDENCE GUIDE**

This section provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Identified washing equipment
	2. Observed safety procedures
	3. Operated salt washing equipment
	4. Established concentration of salt water
	5. Washed salt with concentrated brine
	6. Washed salt with fresh water
	7. Discharged brine water safely
	8. Maintained salt washing equipment
	9. Monitored washing operations
 |
| 1. Resource implications
 | The following resources must be provided:* 1. PPEs
	2. Projector
	3. Computer
	4. Internet connectivity
	5. Cyclone
	6. Vacuum evaporators
	7. Conveyor belt
	8. Grainer
	9. Reference materials
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written tests
	4. Practical
	5. Third party reports
 |
| 1. Context of assessment
 | Candidate will be assessed individually in an actual workplace or in closely simulated work environment. |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# PERFORM SALT DRYING

**UNIT CODE:** MIN/OS/SP/CR/03/4/A

**UNIT DESCRIPTION**

This unit specifies competencies required to perform salt drying. It entails scheduling salt drying operations, monitoring salt stockpiles, operating salt drying equipment and collecting salt samples.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT** These describe the keyoutcomes which make upworkplace function | **PERFORMANCE CRITERIA*****(Bold and italicized terms are elaborated in the Range)*** |
| --- | --- |
| 1. Schedule salt drying operations
 | 1. Drying tasks are identified based on job requirements.
2. Drying personnel are assigned based on task requirement.
3. Salt drying procedures are identified based on prevailing conditions.
4. ***PPEs*** are identified and assigned based on OSHA regulations.
5. Drying equipment maintenance is scheduled based on organizational procedures.
 |
| 1. Monitor salt stockpiles
 | 1. Projected production volume is established based on organizational procedures and plant capacity.
2. Stockpile capacity is established and monitored based on projected production volume and organizational procedure.
3. Stockpile stability is established based on salt physical properties.
4. Moisture content is monitored based on job requirement.
5. Stockpile information is recorded and maintained based on organizational procedures
 |
| 1. Operate salt drying equipment
 | * 1. ***Drying equipment*** is identified and obtained based on task requirements.
	2. Drying equipment is operated based on manufacturer’s specifications.
	3. Safety procedures are observed based on OSHA regulations.
	4. Drying equipment is maintained based organization procedures.
 |
| 1. Collect salt samples
 | 1. Sample points are identified based on standard operating procedures.
2. Salt samples are collected based on organizational procedures.
3. Salt sample information is recorded based on organizational procedure.
4. Salt database is created and maintained based on organizational procedures
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

| **Variable** | **Range*****May include but is not limited to:*** |
| --- | --- |
| 1. Physical properties may include but not limited to
 | * Colour
* Strength
* Hardness
* Lustre
* Density
 |
| 1. Drying equipment may include but not limited to
 | * Grainer
* Vacuum evaporator
* Rotary drier
* Salt vibration fluid bed drier
 |
| 1. PPEs may include but not limited to
 | * Overall
* Gumboots
* Safety goggles
* Sunglasses
* Safety boots
* Helmet
* Gloves
 |

**REQUIRED KNOWLEDGE**

The individual needs to demonstrate knowledge of:

* + Drying equipment
	+ Phases of matter
	+ Basic Chemistry
	+ Salt impurities and insoluble
	+ Crystallization
	+ Sources of salt
	+ Application of salt
	+ Stockpiles

**REQUIRED SKILLS**

The individual needs to demonstrate the following skills:

* + Operating drying equipment
	+ Record keeping
	+ Collecting salt samples
	+ Communication
	+ Ability to use PPEs
	+ Problem solving
	+ Observation
	+ Sampling

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Identified drying equipment
	2. Assigned personnel
	3. Measured moisture content
	4. Projected production volume
	5. Established stockpile capacity
	6. Established stockpile stability
	7. Established plant capacity
	8. Maintained drying equipment
	9. Observed safety procedures
	10. Recorded stockpile information
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Reference materials
	2. PPEs
	3. Computers
	4. Tools and Equipment
	5. Internet connectivity
	6. Grainer
	7. Vacuum evaporator
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written tests
	4. Third Party report
	5. Practicals
 |
| 1. Context of assessment
 | Candidate will be assessed individually in an actual Workplace or in closely simulated work environment. |
| 1. Guidance information for assessment.
 | This unit may be assessed on an integrated basis with others within this occupational sector. |

# PERFORM SALT GRINDING

**UNIT CODE:** MIN/OS/SP/CR/04/4/A

**UNIT DESCRIPTION**

This unit specifies competencies required to perform salt grinding. It entails scheduling salt grinding operations, operating salt grinding equipment, performing screening and salt grading operations. It also includes collecting salt samples.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT** These describe the keyoutcomes which make upworkplace function | **PERFORMANCE CRITERIA*****(Bold and italicized terms are elaborated in the Range)*** |
| --- | --- |
| 1. Schedule salt grinding operations
 | * 1. Grinding tasks are identified based on processing method
	2. ***Grinding equipment*** is identified and assigned based on task requirement
	3. PPEs are identified and assigned based on OSHA regulations
	4. Grinding personnel are assigned based on task requirement
	5. Grinding equipment maintenance is scheduled based on organizational procedures
 |
| 1. Operate salt grinding equipment
 | * 1. Grinding equipment is identified and obtained based on task requirement
	2. Safety procedures are observed based on OSHA regulations
	3. Salt physical properties are established based on grinder manufacturers specifications
	4. Grinding equipment is operated based on manufacturer specification
	5. Grinding equipment is maintained based on organizational procedures and manufacturer’s specifications
 |
| 1. Perform screening operations
 | * 1. ***Screens*** are identified and obtained based on task requirements and physical properties
	2. Screens are operated based on task requirements and manufacturers specifications
	3. Screen analysis is performed based on screen types
 |
| 1. Perform salt grading operation
 | * 1. ***Grading method*** is identified and assigned based on task requirement
	2. ***Additives*** are added based on salt application
	3. ***Chemical and physical property*** of salt is established based on grading method and organizational procedures
	4. Salt grading is performed based on chemical and physical property of salt and salt particle size
	5. Salt grade information is recorded based on organizational procedures
 |
| 1. Collect salt samples
 | * 1. Sample points are identified based on grading process and organizational procedures
	2. Salt sample are collected based organizational procedures
	3. Grading records are documented based on organizational procedures
	4. Salt database is created and maintained based on organizational procedures
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

| **Variable** | **Range*****May include but is not limited to:*** |
| --- | --- |

|  |  |
| --- | --- |
| 1. Grinding equipment may include but not limited to:
 | * Salt grinding machine
* Salt milling machine
* Pulveriser
 |
| 1. Screens may include but not limited to:
 | * Static screens
* Vibrating screens
* Rotating screens
 |
| 1. Grading method may include but not limited to:
 | * Food salt grading
* Industrial salt grading
 |
| 1. Additives may include but not limited to:
 | * Potassium Iodide
* Silicon dioxide
* Tri-calcium phosphate
 |
| 1. Chemical and physical property
 | * Colour
* Solubility
* Hardness
* Density
 |

**REQUIRED KNOWLEDGE**

The individual needs to demonstrate knowledge of:

* Screening
* Salt grinding
* Grading of salt
* Salt grinding equipment
* Physical and chemical properties of salt
* Salt Additives
* Application of salt

**REQUIRED SKILLS**

The individual needs to demonstrate the following skills:

* Record keeping
* Screen analysis
* Operating grinding equipment
* Grading of salt
* Screening salt
* Collecting salt samples

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Identified grinding equipment
	2. Identified different types of screens
	3. Identified salt additives
	4. Operated grinding equipment
	5. Conducted salt screening
	6. Established chemical and physical properties of salt
	7. Graded salt
	8. Maintained grinding equipment
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Screens
	2. Grinding machines
	3. Reference materials
	4. PPEs
	5. Computers
	6. Internet connectivity

  |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written tests
	4. Practical
	5. Third party reports
 |
| 1. Context of Assessment
 | Candidate will be assessed individually in an actual Work place or in closely simulated work environment. |
| 1. Guidance information for assessment
 | This unit may be assessed on an integrated basis with others withinthis occupational sector. |

# PERFORM SALT PACKAGING

**UNIT CODE:** MIN/OS/SP/CR/05/4/A

**UNIT DESCRIPTION**

This unit specifies competencies required to perform salt packaging. It entails scheduling packaging and bagging operations, performing salt sorting and performing salt bagging and packaging operations.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT** These describe the keyoutcomes which make upworkplace function | **PERFORMANCE CRITERIA*****(Bold and italicized terms are elaborated in the Range)*** |
| --- | --- |
| 1. Schedule packaging and bagging operations
 | * 1. ***Salt packaging and bagging equipment*** are identified based on task requirement
	2. Packaging and bagging equipment maintenance are scheduled based on organizational procedures and manufacturers specifications
	3. Packaging and bagging procedures is established based on organizational procedures
	4. Packaging and bagging personnel are assigned based on task requirement and organizational procedures
	5. ***PPEs*** are identified based on task requirement and OSHA regulations
 |
| 1. Perform salt sorting
 | * 1. Sorting is established based on application of salt.
	2. ***Applications of salt*** is identified based on purity of salt
	3. ***Salt particle sizes*** are established based on screening output.
	4. ***Additives*** are added based on salt application
	5. Purity of salt is determined based on grading standards
	6. Sorting is performed based on Salt particle sizes and purity.
 |
| 1. Perform salt bagging and packaging operations
 | * 1. ***Salt packaging and bagging equipment*** are identified and obtained based on task requirement
	2. ***Bagging and packaging materials*** are acquired based on salt grading and application
	3. Salt bagging and packaging is performed based on organizational procedures and manufacturers specifications
	4. labelling of bags and packs is conducted according to labelling standards and organizational procedures
	5. Bagging and packing operation information are recorded based on organizational procedures
	6. Safety procedures are observed during operation based on OSHA regulations
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

| **Variable** | **Range*****May include but is not limited to:*** |
| --- | --- |
| 1. Salt bagging and packaging equipment may include but not limited to:
 | * Salt jumbo bag packing machine
* Y steel vertical sachet bag salt machine
* Automatic bagging machine
 |
| 1. Additives may include but not limited to:
 | * Potassium Iodide
* Silicon dioxide
* Tri-calcium phosphate
 |
| 1. Salt particle sizes may include but not limited to:
 | * Coarse salt
* Washed salt
* Whole coarse salt
* Coarse dried salt
* Fine dried salt
 |
| 1. Bagging and packaging materials may include but not limited to:
 | * Bags
* Sachets
* Extractor tape
 |
| 1. PPEs may include but not limited to:
 | * Gloves
* Goggles
* Over coat
* Helmet
 |
| 1. Application of salts may include but not limited to:
 | * Industrial salt
* Metal recovery
* Paper manufacturing
* Rubber processing
* Dyes and textiles
* Agricultural application
* Fertilizer
* Hide and skin
* Medical cleansing
* Dairy products
* Food preparation
 |

**REQUIRED KNOWLEDGE**

The individual needs to demonstrate knowledge of:

* Packaging equipment
* Bagging equipment
* Salt sorting
* Salt additives
* Salt applications
* Labelling of salt bags and sacks
* Maintenance of bagging and packaging equipment

**REQUIRED SKILLS**

The individual needs to demonstrate the following skills:

* Labelling
* Bagging
* Packing
* sorting
* Screen size analysis
* Sampling
* Record keeping

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Scheduled maintenance of equipment
	2. Identified packaging equipment
	3. Identified bagging equipment
	4. Identified physical properties of salt
	5. Identified proper PPEs
	6. Performed labelling
	7. Performed bagging operation
	8. Performed packaging operation
	9. Conducted salt grading
	10. Maintained packaging and bagging equipment
	11. Observed safety procedures
	12. Maintained bagging and packaging operation records
 |
| 1. Resource implications
 | The following resources must be provided:1. Bagging machines
2. Packaging machines
3. Salt bags
4. Salt sachets
5. Reference materials
6. PPEs
7. Computers
8. Internet connectivity
 |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written tests
4. Practical
5. Third party reports
 |
| 1. Context of Assessment.
 | Candidate will be assessed individually in an actual Work place or in closely simulated work environment. |
| 1. Guidance information for assessment.
 | This unit may be assessed on an integrated basis with others within this occupational sector. |