

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**OIL PIPELINE MECHANICAL MAINTENANCE**

**LEVEL 5**



 TVET CDACC

 P.O. BOX 15745-00100

 NAIROBI

First published 2017

Copyright TVET CDACC

All rights reserved. No part of this curriculum may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of the TVET CDACC, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law. For permission requests, write to the Council Secretary/CEO, at the address below:

**Council Secretary/CEO**

**TVET Curriculum Development, Assessment and Certification Council**

**P.O. Box 15745–00100**

**Nairobi, Kenya**

**Email: cdacc.tvet@gmail.com**

# 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 to 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 Oil Pipeline mechanical maintenance level 5. These Occupational Standards will also be the bases 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 Oil and Gas 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 Oil and Gas Sector Skills Advisory Committee (SSAC), have developed these National Occupational Standards for an Oil pipeline mechanical maintenance technician. These standards will be the bases for development of competency-based curriculum for Oil and Pipeline Mechanical Maintenance Level 5. These Standards will also be the bases 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, Oil and Gas SSAC, expert workers and all those who participated in the development of these occupational standards.

**Prof. CHARLES M. M. ONDIEKI, PhD, FIET (K), Con. EngTech.**

**CHAIRMAN, 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 Oil and Gas 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.

**CHAIRMAN**

**OIL AND GAS SECTOR SKILLS ADVISORY COMMITTEE**

# ACRONYMNS

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

MM Mechanical maintenence

OG Oil and Gas

OSHA Occupation Safety and Health Act

PPE Personal Protective Equipment

SSAC Sector Skills Advisory Committee

TVET Technical and Vocational Education and Training

TVET CDACC TVET Curriculum Development Assessment and Certification Council

# KEY TO UNIT CODE

 OG/OS/MM/BC/01/5/A

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

# TABLE OF CONTENTS

[FOREWORD ii](#_Toc30379154)

[PREFACE iii](#_Toc30379155)

[ACKNOWLEDGEMENT iv](#_Toc30379156)

[ACRONYMNS v](#_Toc30379157)

[KEY TO UNIT CODE vi](#_Toc30379158)

[TABLE OF CONTENTS vii](#_Toc30379159)

[OVERVIEW viii](#_Toc30379160)

[BASIC UNITS OF COMPETENCY 1](#_Toc30379161)

[DEMONSTRATE COMMUNICATION SKILLS 2](#_Toc30379162)

[DEMONSTRATE NUMERACY SKILLS 6](#_Toc30379163)

[DEMONSTRATE DIGITAL LITERACY 12](#_Toc30379164)

[DEMONSTRATE ENTREPRENEURIAL SKILLS 18](#_Toc30379165)

[DEMONSTRATE EMPLOYABILITY SKILLS 23](#_Toc30379166)

[DEMONSTRATE ENVIRONMENTAL LITERACY 32](#_Toc30379167)

[DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES 39](#_Toc30379168)

[MAINTAIN OIL TERMINAL PUMPS 46](#_Toc30379169)

[MAINTAIN OIL PIPELINE MAINLINE PUMPS 50](#_Toc30379170)

[MAINTAIN OIL PIPELINE PUMP-SET FLUID COUPLING 54](#_Toc30379171)

[PERFORM EQUIPMENT SHAFT ALIGNMENT 58](#_Toc30379172)

[MAINTAIN OIL PIPELINE VALVES 62](#_Toc30379173)

[MAINTAIN OIL PIPELINE VALVE ACTUATORS 66](#_Toc30379174)

[MAINTAIN OIL PIPELINE FLOW METERS 70](#_Toc30379175)

[MAINTAIN OIL PRODUCT TANKS 74](#_Toc30379176)

[PERFORM OIL PIPELINE MAINTENANCE 78](#_Toc30379177)

**OVERVIEW**

Oil and Gas Mechanical Maintenence Level 5 qualification consists of competencies that a person must achieve to enable him/her to maintain oil terminal pumps, maintain oil pipeline mainline pumps,maintain oil pipeline pump-set fluid couplings,perform equipment shaft alignment,maintain oil pipeline valves,maintain oil pipeline valve actuator,maintain oil pipeline product meters,perform product tank maintenance and perform oil pipeline maintenance

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

**Basic Units of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| OG/OS/MM/BC/01/5/A | Demonstrate communication skills |
| OG/OS/MM/BC/02/5/A | Demonstrate numeracy skills |
| OG/OS/MM/BC/03/5/A | Demonstrate digital literacy |
| OG/OS/MM/BC/04/5/A | Demonstrate entrepreneurial skills |
| OG/OS/MM/BC/05/5/A | Demonstrate employability skills |
| OG/OS/MM/BC/06/5/A | Demonstrate environmental literacy |
| OG/OS/MM/BC/07/5/A | Demonstrate occupational safety and health practices |

**Core Units of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| OG/OS/MM/CR/01/5/A | Maintain Oil terminal pumps  |
| OG/OS/MM/CR/02/5/A | Maintain oil pipeline mainline pumps  |
| OG/OS/MM/CR/03/5/A | Maintain oil pipeline pump-set fluid coupling  |
| OG/OS/MM/CR/04/5/A | Perform equipment shaft alignment  |
| OG/OS/MM/CR/05/5/A | Maintain oil pipeline valves  |
| OG/OS/MM/CR/06/5/A | Maintain oil pipeline valve actuators |
| OG/OS/MM/CR/07/5/A | Maintain oil pipeline flow meters |
| OG/OS/MM/CR/08/5/A | Maintain oil product tanks |
| OG/OS/MM/CR/09/5/A | Perform oil pipeline maintenance  |

**BASIC UNITS OF COMPETENCY**

# DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE: OG/OS/MM/BC/01/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to use specialized communication skills to meet specific needs of internal and external clients, conduct interviews, facilitate discussion with groups and contribute to the development of communication strategies.

**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. Meet communication needs of clients and colleagues
 | 1. Specific communication needs of clients and colleagues are identified and met
2. Different approaches are used to meet communication needs of clients and colleagues
	1. Conflict is addressed promptly and in a timely way and in a manner which does not compromise the standing of the organization
 |
| 1. Contribute to the development of communication strategies
 | * 1. Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as required
	2. Channels of communication are established and reviewed regularly
	3. Coaching ineffective communication is provided
	4. Work related network and relationship are maintained as necessary
	5. Negotiation and conflict resolution strategies are used where required
	6. Communication with clients and colleagues is appropriate to individual needs and organizational objectives
 |
| 1. Conduct interviews
 | 1. A range of appropriate communication strategies are employed in ***interview situations***
2. Records of interviews are made and maintained in accordance with organizational procedures
	1. Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated
 |
| 1. Facilitate group discussions
 | 1. Mechanisms which enhance effective group interaction is defined and implemented
2. Strategies which encourage all group members to participate are used routinely
3. Objectives and agenda for meetings and discussions are routinely set and followed
4. Relevant information is provided to group to facilitate outcomes
5. Evaluation of group communication strategies is undertaken to promote participation of all parties
	1. Specific communication needs of individuals are identified and addressed
 |
| 1. Represent the organization
 | 1. When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization
2. Presentation is clear and sequential and delivered within a predetermined time
3. Utilize appropriate media to enhance presentation
4. Differences in views are respected
5. Written communication is consistent with organizational standards
	1. Inquiries are responded in a manner consistent with organizational standard
 |

**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** |
| Communication strategiesinclude but not limited to: | * Language switch
* Comprehension check
* Repetition
* Asking confirmation
* Paraphrase
* Clarification request
* Translation
* Restructuring
* Approximation

Generalization |
| Effective group interaction includes but not limited to: | * Identifying and evaluating what is occurring within an interaction in a non-judgmental way
* Using active listening
* Making decision about appropriate words, behavior
* Putting together response which is culturally appropriate
* Expressing an individual perspective
* Expressing own philosophy, ideology and background and exploring impact with relevance to communication

Openness and flexibility in communication |
| 1. Situations include but not limited to:
 | * Establishing rapport
* Eliciting facts and information
* Facilitating resolution of issues
* Developing action plans

Diffusing potentially difficult situations |

**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:

* Effective communication process
* Active listening
* Giving/receiving feedback
* Interpretation of information
* Role boundaries setting
* Negotiation
* Establishing empathy
* Openness and flexibility in communication
* Communication skills required to fulfill job roles as specified by the organization

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Communication process
* Dynamics of groups and different styles of group leadership
* Communication skills relevant to client groups
* Flexibility in communication
* Communication skills relevant to client groups

**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. Met communication needs of clients and colleagues
2. Contributed to the development of communication strategies
3. Conducted interviews
4. Facilitated group discussions

1.5 Represented the organization |
| 1. Resource Implications
 | The following resources should be provided: 1. Access to relevant workplace or appropriately simulated environment where assessment can take place

4.2 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Direct Observation
2. Demonstration with Oral Questioning

3.3 Written Examination |
| 1. Context of Assessment
 | Competency may be assessed individually in the actual workplace or through accredited institution |
| 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:** **OG/OS/MM/BC/02/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to perform numerical functions. The person who is competent in this unit shall be able to: Calculate with whole numbers and familiar fractions, decimals and percentages for work; Estimate, measure, and calculate with routine metric measurements for work; Use routine maps and plans for work; Interpret, draw and construct 2D and 3D shapes for work; Interpret routine tables, graphs and charts for work; Collect data and construct routine tables and graphs for work; and Use basic functions of calculator

**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. Calculate with whole numbers and familiar fractions, decimals and percentages for work
 | 1. Mathematical information that may be partly embedded in routine workplace tasks and texts is selected and interpreted
2. Whole numbers and routine or familiar fractions, decimals and percentages including familiar rates are interpreted and comprehended
3. Calculations which may involve a number of steps are perform
4. Calculations done with whole numbers and routine or familiar fractions, decimals and percentages
5. Conversion between equivalent forms of fractions, decimals and percentages is done
6. Order of operations is applied to solve multi-step calculations
7. Problem solving strategies are appropriately applied
8. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task
	1. Formal and informal mathematical language and symbolism are used to communicate the result of the task
 |
| 2. Estimate, measure, and calculate with routine metric measurements for work | 1. Measurement information in workplace tasks and texts are selected and interpreted in accordance with workplace requirements
2. Appropriate routine measuring equipment are identified and selected in accordance with workplace requirements
3. Measurements are estimated and made using correct units
4. Estimations and calculations done using routine measurements
5. Conversions performed between routinely used metric units
6. Problem solving processes are used to undertake the tasks
7. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task
	1. Information is recorded using mathematical language and symbols appropriate to discuss the task
 |
| 3. Use routine maps and plans for work | 1. Features are identified in routine maps and plans
2. Symbols and keys in routine maps and plans are clearly explained
3. Orientation of map to North is identified and interpreted
4. Understanding of direction and location is clearly demonstrated
5. Simple scale is applied to estimate length of objects, or distance to location or object
	1. Directions are given and received using both formal and informal language
 |
| 4. Interpret, draw and construct 2D and 3D shapes for work | 1. Two dimensional shapes and routine three dimensional shapes identified in everyday objects and in different orientations
2. The use and application of shapes elaborately explained
3. Formal and informal mathematical language and symbols used to describe and compare the features of two dimensional shapes and routine three dimensional shapes
4. Common angles identified
5. Common angles in everyday objects are appropriately estimated
6. Formal and informal mathematical language are used to describe and compare common angles
7. Common geometric instruments used to draw two dimensional shapes
	1. Routine three dimensional objects constructed from given nets
 |
| 5. Interpret routine tables, graphs and charts for work | 1. Routine tables, graphs and charts identified in predominately familiar texts and contexts
2. common types of graphs and their different uses identified
3. features of tables, graphs and charts identified
4. Information in routine tables, graphs and charts located and interpreted
5. Calculations are perform to interpret information
6. How statistics can inform and persuade interpretations is explained
7. misleading statistical information is identified
	1. Information relevant to the workplace is discussed
 |
| 6. Collect data and construct routine tables and graphs for work | 1. Features of common tables and graphs identified
2. uses of **different tables and graphs** identified
3. Data and variables to be collected are determined
4. The audience is determined
5. Method of data collection is select
6. Data is collected
7. Information is collated in a table
8. Suitable scale and axes determined
9. Graph to present information is drafted and drawn
10. Data checked to ensure that it meets the expected results and context
	1. Information is reported or discussed using formal and informal mathematical language
 |
| 7. Use basic functions of calculator | 1. Keys are identified and used for **basic functions on a calculator**
2. Calculation done using whole numbers, money and routine decimals and percentages
3. Calculation done with routine fractions and percentages
4. Order of operations is applied to solve multi-step calculations
5. Results are interpreted, displayed and recorded
6. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task
	1. Formal and informal mathematical language and appropriate symbolism and conventions used to communicate the result of the task
 |

**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 fractions, decimals and percentages
 | May include but not limited to:* 1. Fraction
	2. Decimals

1.3 Percentages |
| 1. Common 2D shapes and common 3D shapes
 | May include but not limited to:1. Round
2. Square
3. Rectangular
4. Triangle
5. Sphere
6. Cylinder
7. Cube
8. Polygons

2.9 Cuboids  |
| Symbols and keys in routine maps and plans | May include but not limited to:1. Charts
2. Maps
3. Graphs
 |
| Use basic functions of calculator | May include but not limited to:4.1 Addition4.2 Multiplication4.3 Calculate ratios 4.4 Conversion of ratios into percentages |
| Routine tables, graphs and charts for work | May include but not limited to:5.1 Bar Graphs5.2 Flow Charts5.3 Pie Charts5.4 Pictograph5.5 Line Graphs5.6 Time Series Graphs5.7 Stem and Leaf Plot5.8 Histogram5.9 Dot Plot5.10 Scatter plot |

**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:

* Applying Fundamental operations (addition, subtraction, division, multiplication)
* Using calculator
* Using different measuring tools

**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. Calculated correctly with whole numbers and routine or familiar fractions, decimals and percentages
2. Estimated, measured and calculated with routine metric measurements
3. Applied simple scale to estimate length of objects or distance to location or object
4. Used formal and informal mathematical language to describe and compare common angles
5. Used common geometric instruments to draw two dimensional shapes
6. Collected data and constructed routine tables and graphs
	1. Used basic functions of calculator correctly
 |
| 2. Resource Implications | 2.1 Calculator* 1. Basic measuring instruments
 |
| 1. 3. Methods of Assessment
 | Competency may be assessed through:3.1 Written Test3.2 Interview/Oral Questioning* 1. Demonstration
 |
| 1. 4. Context of Assessment
 | Competency may be assessed in an off the job setting  |
| 1. 5. 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: OG/OS/MM/BC/03/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to effectively use digital devices such as smartphones, tablets, laptops and desktop PCs. It entails identifying and using digital devices such as smartphones, tablets, laptops and desktop computers for purposes of communication, work performance and management at the work place.

**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 appropriate computer software and hardware
 | * 1. Concepts of ICT are determined in accordance with computer equipment
	2. Classifications of computers are determined in accordance with manufacturers specification
	3. ***Appropriate computer software*** is identified according to manufacturer’s specification
	4. ***Appropriate computer hardware*** is identified according to manufacturer’s specification
	5. Functions and commands ofoperating system are determined in accordance withmanufacturer’s specification
 |
| 1. Apply security measures to data, hardware, software in automated environment
 | * 1. ***Data security and privacy are classified*** in accordance with the prevailing technology
	2. ***Security threats*** areidentified, **and *control measures*** are applied in accordance with laws governing protection of ICT
	3. Computer threats and crimes are detected.
	4. Protection against computer crimes is undertaken in accordance with laws governing protection of ICT
 |
| 1. Apply computer software in solving tasks
 | * 1. ***Word processing concepts***are applied in resolving workplace tasks, report writing and documentation
	2. ***Word processing utilities*** are applied in accordance with workplace procedures
	3. Worksheet layout is prepared in accordance with work procedures
	4. Worksheet is build and data manipulated in the worksheet in accordance with workplace procedures
	5. Continuous data manipulated on worksheet is undertaken in accordance with work requirements
	6. Database design and manipulation is undertaken in accordance with office procedures
	7. Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures
 |
| 1. Apply internet and email in communication at workplace
 | * 1. Electronic mail addresses are opened and applied in workplace communication in accordance with office policy
	2. Office internet functions are defined and executed in accordance with office procedures
	3. ***Network configuration*** is determined in accordance with office operations procedures
	4. Official World Wide Web is installed and managed according to workplace procedures
 |
| 1. Apply desktop publishing in official assignments
 | * 1. Desktop publishing functions and tools are identified in accordance with manufactures specifications
	2. Desktop publishing tools are developed in accordance with work requirements
	3. Desktop publishing tools are applied in accordance with workplace requirements
	4. Typeset work is enhanced in accordance with workplace standards
 |
| 1. Prepare presentation packages
 | * 1. Types of presentation packages are identified in accordance with office requirements
	2. Slides are created and formulated in accordance with workplace procedures
	3. Slides are edited and run in accordance with work procedures
	4. Slides and handouts are printed according to work 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.

|  |  |
| --- | --- |
| **Range** | **Variable** |
| Appropriate computer software may include but not limited to: | * A collection of instructions or computer tools that enable the user to interact with a computer, its hardware, or perform tasks.
 |
| Appropriate computer hardware may include but not limited to: | Collection of physical parts of a computer system such as;* Computer case, monitor, keyboard, and mouse
* All the parts inside the computer case, such as the hard disk drive, motherboard and video card
 |
| Data security and privacy may include but not limited to: | * Confidentiality of data
* Cloud computing
* Integrity -but-curious data surfing
 |
| Security and control measures may include but not limited to: | * Counter measures against cyber terrorism
* Risk reduction
* Cyber threat issues
* Risk management
* Pass wording
 |
| Security threats may include but not limited to: | * Cyber terrorism
* Hacking
 |
| Word processing concepts may include but not limited to: | Using a special program to create, edit and print documents |
| Network configuration may include but not limited to: | * Organizing and maintaining information on the components of a computer network
 |

**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 skills
* Interpretation
* Typing
* Communication
* Computing (applying fundamental operations such as addition, subtraction, division and multiplication)
* Using calculator
* Basic ICT skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Software concept
* Functions of computer software and hardware
* Data security and privacy
* Computer security threats and control measures
* Technology underlying cyber-attacks and networks
* Cyber terrorism
* 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 sheets;
* Meaning, formulae, function and charts, uses and layout
* Data formulation, manipulation and application to cells
* Database;
* Database design, data manipulation, sorting, indexing, storage retrieval and security
* Desktop publishing;
* Designing and developing desktop publishing tools
* Manipulation of desktop publishing tools
* Enhancement of typeset work and printing documents
* Presentation Packages;
* Types of presentation Packages
* Creating, formulating, running, editing, printing and presenting slides and handouts
* Networking and Internet;
* Computer networking and internet.
* Electronic mail and world wide web
* Emerging trends and issues in ICT;
* Identify and integrate 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 and controlled security threats
	2. Detected and protected computer crimes
	3. Applied word processing in office tasks
	4. Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures
	5. Opened electronic mail for office communication as per workplace procedure
	6. Installed internet and World Wide Web for office tasks in accordance with office procedures
	7. Integrated emerging issues in computer ICT applications
	8. Applied laws governing protection of ICT
 |
| 1. Resource Implications
 | * 1. Tablets
	2. Laptops
	3. Desktop computers
	4. Calculators
	5. Internet
	6. Smart phones
	7. Operation Manuals
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Written Test
	2. Demonstration
	3. Practical assignment
	4. Interview/Oral Questioning
	5. Demonstration
 |
| 1. Context of Assessment
 | Competency may be assessed in an off and on the job setting |
| 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:** **OG/OS/MM/BC/04/5/A**

**UNIT DESCRIPTION**

This unit covers the outcomes required to build and develop the enterprise to be more competitive within a changing business environment, specifically responding to consumer demands while maintaining product quality and accessibility, building a customer base and employee motivation.

**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. Develop business Innovative strategies
 | 1. Business innovation strategies are determined in accordance with the organization strategies
2. Business innovative strategies are implemented for the purpose of business growth
3. Track record and normative capability profile of enterprise and similar businesses are reviewed and considered in setting ***strategic directions***.
4. Strengths, weaknesses, opportunities and threats are considered when developing new ideas, approaches, goals and directions
5. Decisions about enterprise strategies/directions are made after careful consideration of all relevant information
6. ***Business/corporate plan*** is developed that sets out tactics, resource implications, timeframes, production and sales target
 |
| * 1. Develop new products/ markets
 | 2.1 Alternative product/service offerings are canvassed and studied for feasibility2.2 Potential and new sources/sellers of supplies and raw materials are identified and canvassed.2.3 Target markets and buyers are identified and surveyed as to their preferences and brand loyalties. |
| * 1. Expand customers and product lines
 | 3.1 Enterprise is built up and sustained through responsiveness to market demands and the regulatory environment. 3.2 Competitive advantage of existing products and services is maintained/enhanced through responsive advocacies and strategies. 3.3 Constant listening to stakeholder/client feedback is ensured to maintain loyal client base.  |
| * 1. Motivate staff/workers
 | 4.1 Regular dialogue is established and maintained in all levels and relevant sections of the enterprise4.2 Flow of communications in both directions is encouraged4.3 Helpful mechanisms and benefits are implemented4.4 Issues/problems are proactively resolved through win-win solutions wherever practicable |
| 5. Expand employed capital base | 5.1 Capital employed in business is continuously reviewed as per the strategic plan5.2 Business share holdings are reviewed in accordance with the type of business 5.3 Capital employed is expanded according to organization procedures5.3 Types of shares are determined according to strategic plan5.4 Shares diversification process is undertaken as per office procedures5.5 Role of shareholders is determined and implemented in accordance organization procedures  |
| 6. Undertake county/ regional business expansion | 6.1 Regions for expansion are continuously reviewed in accordance with strategic plan and company’s expansion plan6.2 County business regulations are reviewed and adhered to in accordance with set procedures6.3 Regional laws and regulations are adhered to in accordance with set procedures6.4 County/regional business expansion is undertaken in accordance with organization’s growth/ expansion plan |

**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**  |
| Strategic directions include but not limited to: | 1.1 Business continuity and succession1.2 Resource access security1.3 Core competencies development1.4 New developments e.g. technological change, new products |
| Business/Corporate plan include but not limited to: | 2.1 Action steps and responsibilities of departments and individual workers 2.2 Resource requirements and budget 2.3 Tactics and strategies to achieve objectives  |
| Helpful mechanisms include but not limited to: | 3.1 Wage and non-wage benefits 3.2 Employee awards and recognition systems 3.3 Employee rights and welfare policies 3.4 Full-disclosure/transparency policies  |

**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:

* Assessing a range of alternative products and strategies
* Critically analyzing information, summarizing and making sense of previous and current market trends
* Identifying changing consumer preferences and demographics
* Thinking “outside the box”
* Ensuring quality consistency
* Reducing lead time to product/service delivery
* Managing operations/ production
* Using formal problem-solving procedures, e. g., root-cause analysis, six sigmas
* Communication skills
* Applying motivational principles, e. g., positive stroking, behavior modification
* Assessing range of alternatives rather than choosing the easiest option
* Achieving ownership and credibility for the enterprise vision
* Critically analyzing information, summarizing and making sense of previous and current market trends
* Developing solutions and practical strategies which are “outside the box”

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Features and benefits of common operational practices, e. g., continuous improvement (kaizen), waste elimination,
* Conflict resolution
* Health, safety and environment (HSE) principles and requirements
* Public-relations strategies
* Basic cost-benefit analysis
* Basic financial management
* Business strategic planning
* Impact of change on individuals, groups and industries
* Employee assistance
* Government and regulatory processes
* Local and international market trends
* Product promotion strategies
* Mechanisms in the enterprise
* Market and feasibility studies
* Local and global supply chains Business models and strategies
* Government and regulatory processes
* Local and international business environment
* Concepts of change management
* Relevant developments in other industries
* Capital employed
* Regional/ County business expansion
* Innovation in business

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1.1 Demonstrated ability to maintain a profitable and stable enterprise as shown by stakeholder feedback, employee testimonies and company financial statements1.2 Demonstrated ability to conceptualize and plan a micro/small enterprise1.3 Demonstrated ability to manage/operate a micro/small-scale business1.4 Demonstrated basic marketing skills |
| 1. 2. Resource Implications
 | The following resources should be provided:2.1 Interview guide for entrepreneurs2.2 Enterprise workers and third parties 2.3 Materials and location relevant to the proposed activity and tasks  |
| 1. 3. Methods of Assessment
 | 3.1 Case problems3.2 Interview3.3 Portfolio3.4 Third part reports |
| 1. 4. Context of Assessment
 | 4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group  |
| 1. 5. 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: OG/OS/MM/BC/05/5/A**

**UNIT DESCRIPTON**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading small teams, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills 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. Emotions are managed 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.
6. Self-esteem and a positive self-image are developed and maintained.
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 as per ***personal objectives***
10. Critics are managed as per personal objectives
 |
| 1. Demonstrate interpersonal communication
 | 1. Listening and understanding is demonstrated as per communication policy
2. Writing to the needs of the audience is demonstrated as per communication policy
3. Speaking, reading and writing is demonstrated as per communication policy
4. Empathising is demonstrated as per the communication policy
5. Internal and external customers’ needs are identified and interpreted as per the communication policy
6. Persuasion is demonstrated as per the communication policy
7. Communication nnetworks are established as per the SOPs
	1. Information is shared as per communication structure
 |
| Demonstrate critical safe work habits  | * 1. Stress is managed in accordance with workplace procedures.
	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. Work priorities are set in accordance to workplace procedures.
	5. Leisure time is recognized in line with organization policy.
	6. Abstinence from ***drug and substance abuse*** is observed as per workplace policy.
	7. Awareness of HIV and AIDS is demonstrated in line with workplace requirements.
	8. Safety consciousness is demonstrated in the workplace based on organization safety policy.
	9. ***Emerging issues*** are dealt with in accordance with organization policy.
 |
| 1. Lead small teams
 | 1. Performance expectations for the ***team*** are set as per the organization objectives
2. Tasks are assigned in accordance with the organization policy.
3. Team performance indicators are identified according to set rules and regulations.
4. ***Forms of communication*** in a team are established according to office policy.
5. Communication is carried out as per workplace place policy and requirements of the job.
6. ***Feedback*** on performance is collected and analyzed based on established team learning process
	1. ***Gender mainstreaming*** is undertaken in accordance with set regulations.
 |
| 1. Plan and organize work
 | 1. Task requirements are identified as per the workplace objectives
2. Task is interpreted in accordance with safety (OHS ), environmental requirements and quality requirements
3. Work activity is organized with other involved personnel as per the SOPs
4. Resources are mobilized, allocated and utilized to meet project goals and deliverables.
5. Work activities are monitored and evaluated in line with organization procedures.
6. Job planning is documented in accordance with workplace requirements.
	1. Time is managed achieve workplace set goals and objectives.
 |
| 1. Maintain professional growth and development
 | * 1. Personal training needs are identified and assessed in line with the requirements of the job.
	2. ***Training and career opportunities*** are identified and availed based on job requirements.
	3. Licensees and certifications relevant to job and career are obtained and renewed.
	4. ***Personal growth*** is pursued towards improving the qualifications set for the profession.
	5. Work priorities are identified based on requirement of the job and workplace policy.
	6. Recognitions are sought as proof of career advancement in line with professional requirements.
 |
| 7.Demonstrate workplace learning  | * 1. Own learning is managed as per workplace policy.
	2. Learning opportunities are sought and allocated based on job requirement and in line with organization policy.
	3. Contribution to the learning community at the workplace is carried out.
	4. ***Range of media for learning*** are identified as per the training need
	5. Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job
	6. Enthusiasm for ongoing learning is demonstrated
	7. Time and effort is invested in learning new skills-based job requirements
	8. Willingness to learn in different context is demonstrated based on available learning opportunities arising in the workplace.
	9. Opportunities for performance improvement are identified proactively in area of work.
	10. Awareness of personal role in workplace ***innovation*** is demonstrated.
 |
| 1. Demonstrate problem solving skills
 | * 1. Problems are identified as per the context of data and circumstances
	2. Problem solutions are sought based on the problem
	3. Independence and initiative in identifying and solving problems is demonstrated.
	4. Team problems are solved as per the workplace guidelines
	5. Problem solving strategies are applied as per the workplace guidelines
 |
| 1. Demonstrate workplace ethics
 | * 1. Policies and guidelines are observed as per the workplace requirements
	2. Self-worth and profession is exercised in line with personal goals and organizational policies
	3. Code of conduct is observed as per the workplace requirements
	4. Personal and professional integrity is demonstrated as per the personal goals
	5. Commitment to jurisdictional laws is demonstrated as per the workplace requirements
 |

**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** |
| Drug and substance abuse include but not limited to: | Commonly abused* Alcohol
* Tobacco
* Miraa
* Over-the-counter drugs
* Cocaine
* Bhang
* Glue
 |
| Feedback includes but not limited to: | * Verbal
* Written
* Informal
* Formal
 |
| Relationships includes but not limited to: | * Man/Woman
* Trainer/trainee
* Employee/employer
* Client/service provider
* Husband/wife
* Boy/girl
* Parent/child
* Sibling relationships
 |
| Forms of communication include but not limited to: | * Written
* Visual
* Verbal
* Non verbal
* Formal and informal
 |
| Team includes but not limited to: | * Small work group
* Staff in a section/department
* Inter-agency group
 |
| Personal growth includes but not limited to: |

|  |
| --- |
| * Growth in the job
* Career mobility
* Gains and exposure the job gives
* Net workings
* Benefits that accrue to the individual as a result of noteworthy performance
 |

 |
| Personal objectives include but not limited to: | * Long term
* Short term
* Broad

Specific |
| Trainings and career opportunities includes but not limited to | * Participation in training programs
* Technical
* Supervisory
* Managerial
* Continuing Education
* Serving as Resource Persons in conferences and workshops
 |
| Resource include but not limited to: | * Human
* Financial
* Technology
* Hardware
* Software
 |
| Innovation include but not limited to: | * New ideas
* Original ideas
* Different ideas
* Methods/procedures
* Processes
* New tools
 |
| Emerging issues include but not limited to: | * Terrorism
* Social media
* National cohesion
* Open offices
 |
| Range of media for learning include but not limited to:  | * Mentoring
* peer support and networking
* IT and courses
 |

**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:

* Personal hygiene practices
* Intra and Interpersonal skills
* Communication skills
* Knowledge management
* Interpersonal skills
* Critical thinking skills
* Observation skills
* Organizing skills
* Negotiation skills
* Monitoring skills
* Evaluation skills
* Record keeping skills
* Problem solving skills
* Decision Making skills
* Resource utilization skills
* Resource mobilization skills

**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
* Resources and allocating resources
* Organizing work
* Monitoring and evaluation
* Record keeping
* Workplace problems and how to deal with them
* Negotiation
* Assertiveness
* Team work
* Gender mainstreaming
* HIV and AIDS
* Drug and substance abuse
* Leadership
* Safe work habits
* Professional growth and development
* Technology in the workplace
* Learning
* Creativity
* Innovation
* 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 interpersonal communication
	3. Demonstrated critical safe work habits
	4. Led small teams
	5. Planned and organized work
	6. Maintained professional growth and development
	7. Demonstrated workplace learning
	8. Demonstrated problem solving skills
	9. Demonstrated workplace ethics
 |
| 1. Resource Implications
 |

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

* 1. Case studies/scenarios
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: * Oral Interview
* Observation
* Third Party Reports

Written |
| 1. Context of Assessment
 | * 1. Competency may be assessed in workplace or in a simulated workplace setting
	2. Assessment shall be observed while tasks are being undertaken whether individually or in-group
 |
| 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:** **OG/OS/MM/BC/06/5/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to follow procedures for environmental hazard control, follow procedures for environmental pollution control, comply with workplace sustainable resource use, evaluate current practices in relation to resource usage, develop and adhere to environmental protection principles/strategies/guidelines.

**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 strictly followed according to environmental regulations and OSHS.
	2. ***Disposal methods*** of hazardous wastes are followed always according to environmental regulations and OSHS.
	3. ***PPE*** is used according to OSHS.
 |
| 1. Control environmental Pollution control
 | * 1. Environmental pollution ***control measures*** are compiled following standard protocol.
	2. Procedures for solid waste management are observed according to Environmental Management and Coordination Act 1999
	3. Methods for minimizing ***noise pollution*** complied following environmental regulations.
 |
| 1. Demonstrate sustainable resource use
 | * 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 to the work group where appropriate.
	2. Current resource usage is measured and recorded by members of the work group.
	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. 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
 |
| 1. Implement specific environmental programs
 | * 1. Programs/Activities are identified according to organizations policies and guidelines.
	2. Individual roles/responsibilities are determined and performed based on the activities identified.
	3. Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines
	4. Stakeholders are consulted based on company guidelines
 |
| 1. Monitor activities on Environmental protection/Programs
 | * 1. Activities are periodically monitored and evaluated according to the objectives of the environmental Program
	2. Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations
	3. Data gathered are analyzed based on evaluation requirements
	4. Recommendations are submitted based on the findings
	5. Management support systems are set/established to sustain and enhance the program
	6. Environmental incidents are monitored and reported to concerned/proper authorities
 |

**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** |
| PPE may include but are not limited to: | 1.1 Mask1.2 Gloves1.3 Goggles1.4 Safety hat1.5 Overall* 1. Hearing protector
	2. Safety boots
 |
| Environmental pollution control measures may include but are not limited to: | * 1. Methods for minimizing or stopping spread and ingestion of airborne particles
	2. Methods for minimizing or stopping spread and ingestion of gases and fumes
	3. Methods for minimizing or stopping spread and ingestion of liquid wastes
 |
| Waste management procedures may include but are not limited to: | 3.1 Sorting3.2 Storing of items3.2 Recycling of items3.3 Disposal of items |
| Resources may include but are not limited to: | 4.1 Electric4.2 Water4.3 Fuel4.3 Telecommunications* 1. Supplies

4.5 Materials |
| Workplace environmental hazards may include but are not limited to: | 5.1Biological hazards5.2 Chemical and dust hazards5.3 Physical hazards |
| Organizational systems and procedures may include but are not limited to:  | 6.1 Supply chain, procurement and purchasing6.2 Quality assurance6.3 Making recommendations and seeking approvals |

**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:

* Following storage methods of environmentally hazardous materials
* Following disposal methods of hazardous wastes
* Using PPE
* Practicing OSHS
* Complying environmental pollution control
* Observing solid waste management
* Complying methods of minimizing noise Pollution
* Complying methods of minimizing wastage
* Employing waste management procedures
* Economizing resource consumption
* Listing of resources used
* Measuring current usage of resources
* Identifying and reporting workplace environmental hazards
* Conveying all environmental issues
* Following environmental regulations
* Identifying environmental regulations
* Assessing procedures for assessing compliance
* Collecting information on environmental and resource efficiency systems and procedures, and Providing information to the work group
* Measuring and recording current resource usage
* Analysing and recording current purchasing strategies.
* Analysing current work processes to access information and data and Assisting identifying areas for improvement
* Analysing resource flow
* Determining efficiency of use/conversion of resources
* Determining causes of low efficiency of use
* Developing plans for increasing the efficiency of resource use
* Checking resource use plans
* Complying to regulations/licensing requirements
* Determining benefit/cost of plans
* Ranking proposals based on benefit/cost compared to limited resources
* Checking proposals meet regulatory requirements
* Monitoring implementation
* Adjusting plan and implementation
* checking new resource usage

**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
* 3Rs principle
* 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
* Identification of areas for improvement
* Resource consuming processes
* Determination of quantity and nature of resource consumed
* Analysis of resource flow of different parts of the resource flow process
* Use/conversion of resources
* Causes of low efficiency of use
* Increasing the efficiency of resource use
* Inspection of resource use plans
* Regulations/licensing requirements
* Determine benefit/cost for alternative resource sources
* Benefit/costs for different alternatives
* Components of proposals
* Criteria on ranking proposals
* Regulatory requirements
* Proposals for improving resource efficiency
* Implementation of resource efficiency plans
* Procedures in monitor implementation
* Adjustments of implementation plan
* Inspection of new resource usage

**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 hazard
	2. Controlled environmental pollution
	3. Demonstrated sustainable resource use
	4. Evaluated current practices in relation to resource usage
	5. Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns.
	6. Described industrial standard environmental practices according to the different environmental issues/concerns.
	7. Resolved problems/ constraints encountered based on management standard procedures
	8. Implemented and monitored environmental practices on a periodic basis as per company guidelines
	9. Recommended solutions for the improvement of the Program

Monitored and reported to proper authorities any environmental incidents |
| 1. Resource Implications
 | The following resources should be provided:* 1. Workplace with storage facilities
	2. Tools, materials and equipment relevant to the tasks (ex. Cleaning tools, cleaning materials, trash bags, etc.)
	3. PPE
	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. Demonstration
	2. Oral questioning
	3. Written examination
	4. Interview/Third Party Reports
	5. Portfolio (citations/awards from GOs and NGOs, certificate of training – local and abroad)

3.6 Simulations and role-plays |
| 1. Context of Assessment
 | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.  |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** **OG/OS/MM/BC/07/5/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to lead the implementation of workplace’s safety and health program, procedures and policies/guidelines.

**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 workplace hazards and risk
 | 1.1 ***Hazards*** in the workplace and/or its ***indicators*** of its presence, are identified1.2 ***Evaluation and/or work environment*** measurements of OSH hazards/risk existing in the workplace is conducted by  Authorized personnel or agency1.3 ***OSH issues and/or concerns*** raised by workers are  Gathered |
| 1. Identify and implement appropriate control measures
 | 2.1 Prevention ***and control measures***, including use of  s***afety gears / PPE (personal protective equipment)*** for specific hazards  identified and implemented2.2 Appropriate ***risk controls*** based on result of OSH hazard evaluation is recommended.2.3 ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures. |
| 1. Implement OSH programs, procedures and policies/ guidelines
 | 3.1 Information to work team about company OSH program, procedures and policies/guidelines are provided3.2 Implementation of OSH procedures and policies/ guidelines are participated3.3 Team members are trained and advised on OSH standards and procedures3.4 Procedures for maintaining ***OSH-related records*** are implemented |

**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** |
| Hazards may include but are not limited to: | 1.1. Physical hazards – impact, illumination, pressure, noise, vibration, extreme temperature, radiation1.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects1.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors1.4 Ergonomics Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles1.5 Physiological factors – monotony, personal relationship, work out cycle1.6 Safety hazards (unsafe workplace condition) – confined space, excavations, falling objects, gas leaks, electrical, poor storage of materials and waste, spillage, waste and debris1.7 Unsafe workers’ act (Smoking in off-limited areas, Substance and alcohol abuse at work) |
| Indicators may include but are not limited to: | 2.1 Increased of incidents of accidents, injuries2.2 Increased occurrence of sickness or health complaints/ symptoms2.3 Common complaints of workers related to OSH2.4 High absenteeism for work-related reasons |
| Evaluation and/or work environment measurements may include but are not limited to: | 3.1 Health Audit3.2 Safety Audit3.3 Work Safety and Health Evaluation3.4 Work Environment Measurements of Physical and Chemical Hazards |
| OSH issues and/or concerns may include but are not limited to: | 4.1 Workers’ experience/observance on presence of work hazards4.2 Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks)4.3 Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines |
| Prevention and control measures may include but are not limited to: | 5.1 Eliminate the hazard (i.e., get rid of the dangerous machine5.2 Isolate the hazard (i.e. keep the machine in a closed room and operate it remotely; barricade an unsafe area off) 5.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)5.4 Use administrative controls to reduce the risk (i.e. give trainings on how to use equipment safely; OSH-related topics, issue warning signages, rotation/shifting work schedule)5.5 Use engineering controls to reduce the risk (i.e. use safety guards to machine)5.6 Use personal protective equipment5.7 Safety, Health and Work Environment Evaluation5.8 Periodic and/or special medical examinations of workers |
| Safety gears /PPE (Personal Protective Equipment’s) may include but are not limited to: | 6.1 Arm/Hand guard, gloves6.2 Eye protection (goggles, shield)6.3 Hearing protection (ear muffs, ear plugs)6.4 Hair Net/cap/bonnet6.5 Hard hat6.6 Face protection (mask, shield)6.7 Apron/Gown/coverall/jump suit6.8 Anti-static suits6.9 High-visibility reflective vest |
| Appropriate risk controls | Appropriate risk controls in order of impact are as follows:7.1 Eliminate the hazard altogether (i.e., get rid of the dangerous machine)7.2 Isolate the hazard from anyone who could be harmed (i.e., keep the machine in a closed room and operate it remotely; barricade an unsafe area off)7.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)7.4 Use administrative controls to reduce the risk (i.e., train workers how to use equipment safely; train workers about the risks of harassment; issue signage)7.5 Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users)7.6 Use personal protective equipment (i.e., wear gloves and goggles when using the machine) |
| Contingency measures may include but are not limited to: | 8.1 Evacuation8.2 Isolation8.3 Decontamination8.4 (Calling designed) emergency personnel |
| Emergency procedures may include but are not limited to: | 9.1 Fire drill9.2 Earthquake drill9.3 Basic life support/CPR9.4 First aid9.5 Spillage control9.6 Decontamination of chemical and toxic9.7 Disaster preparedness/management9.8 se of fire-extinguisher |
| Incidents and emergencies may include but are not limited to: | 10.1 Chemical spills10.2 Equipment/vehicle accidents10.3 Explosion10.4 Fire10.5 Gas leak10.6 Injury to personnel10.7 Structural collapse10.8 Toxic and/or flammable vapors emission. |
| OSH-related Records may include but are not limited to: | 11.1 Medical/Health records11.2 Incident/accident reports11.3 Sickness notifications/sick leave application11.4 OSH-related trainings obtained |

**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:

* Skills on preliminary identification of workplace hazards/risks
* Knowledge management
* Critical thinking skills
* Observation skills
* Coordinating skills
* Communication skills
* Interpersonal skills
* Troubleshooting skills
* Presentation skills
* Training skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* General OSH Principles
* Occupational hazards/risks recognition
* OSH organizations providing services on OSH evaluation and/or work environment measurements (WEM)
* National OSH regulations; company OSH policies and protocols
* Systematic gathering of OSH issues and concerns
* General OSH principles
* National OSH regulations
* Company OSH and recording protocols, procedures and policies/guidelines
* Training and/or counseling methodologies and 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. Identifies hazards/risks in the workplace and/or its indicators
2. Requests for evaluation and/or work environment measurements of OSH hazards/risk in the workplace
3. Gathers OSH issues and/or concerns raised by workers
4. Identifies and implements prevention and control measures, including use of PPE (personal protective equipment) for specific hazards
5. Recommends appropriate risk controls based on result of OSH hazard evaluation and OSH issues gathered
6. Establish contingency measures, including emergency procedures in accordance with organization procedures
7. Provides information to work team about company OSH program, procedures and policies/guidelines
8. Participates in the implementation of OSH procedures and policies/guidelines
9. Trains and advises team members on OSH standards and procedures

Implements procedures for maintaining OSH-related records |
| 1. Resource Implications
 | The following resources should be provided:2.1 Workplace or assessment location2.2 OSH personal records2.3 PPE2.4 Health records |
| 1. Methods of Assessment
 | Competency may be assessed through:3.1 Portfolio Assessment3.2 Interview3.3 Case Study/Situation3.4 Observation/Demonstration and oral questioning |
| 1. Context of Assessment
 | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.  |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# MAINTAIN OIL TERMINAL PUMPS

**UNIT CODE: OG/OS/MM/CR/01/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to maintain oil product pumps in oil terminals. It involves preparing for the maintenance task, setting up maintenance tools and equipment, using appropriate personal protective equipment (PPE), performing pump maintenance to required specifications, test-run and commission serviced pump and complete workplace processes.

This unit standard applies to the oil and gas industry.

**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. Prepare for pump maintenance
 | * 1. Pump maintenance requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required maintenance service is identified from defect notification (equipment defect report)
	4. Scheduled maintenance service is identified from planned preventive maintenance chart
	5. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	6. Materials for the job are identified and locate
	7. Permit to work is processed as per workplace procedures
 |
| 1. Carry out pump maintenance
 | * 1. Correct information is accessed and interpreted from appropriate

manufacturer’s instructions manual.* 1. Pump maintenance is performed as per task requirements and workplace procedures
	2. Tests on sub-assemblies are conducted according to workplace instructions and quality requirements
 |
| 1. Perform pump functional tests
 | * 1. Pump is test run as per workplace procedures
	2. Pump operational parameters are documented and analysed as per workplace procedures
 |
| 1. Complete pump maintenance
 | * 1. Pump is handed over to user as per workplace procedure
	2. Work is completed and appropriate personnel notified in accordance with workplace procedures
	3. Pump maintenance report is prepared and shared with appropriate personnel as per workplace procedure
	4. Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored
 |

**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:*** |
| --- | --- |
| Tools and equipment include but not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Technician toolbox
* Shaft alignment kit
* Bearing handling kit
* Seal lapping machine
 |
| Safety and environmental requirements include but not limited to: | * Occupational Safety and Health Act, 2007
* Environmental Management and Coordination Act, 1999
 |
| Materials include but not limited to: | * Lubricants
* Pump spare parts
* Cleaning materials
 |
| Terminal pumps are limited to: | * Centrifugal – single and multistage, reciprocating, vane, gear, screw, diaphragm
 |

**Required Knowledge**

The section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

* The individual needs to demonstrate knowledge of:
* Safe working practices and procedures to be followed when preparing for terminal pump maintenance
* Permit to work system
* Applicable legislations
* Hazards associated with terminal pump maintenance and how they can be minimised
* Personal protective equipment worn while carrying out pump maintenance
* Types of maintenance for oil terminal pumps
* Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
* Types, sizes, capacities and capabilities of pumps
* Types of pumps and pump drivers used in oil terminals
* Terminology used for pump and pump performance
* How to isolate and prepare a pump for maintenance
* Actions to be taken by the performer and operator before pump maintenance
* Service and overhaul techniques for terminal pumps
* How to examine pump parts for defects - wear, corrosion, porosity, cracks
* Problems that can occur during pump maintenance and how they can be overcome
* Safe working practices and procedures to be followed when maintaining pump
* Types of mechanical seals and their applications
* Bearings, lubrication, and applications
* How to perform shaft alignment on pump and drive
* Visual examination of pump casing, wear rings, shaft and impeller
* Procedures for reassembly of the pump
* Procedure for test running a pump after maintenance
* Normal pump operating characteristics – vibrations, temperature, flow-rate, pressure, speed, mountings, pump performance curve
* Procedure for testing quality of maintenance using pump parameters
* Equipment handing over procedures after maintenance
* Maintenance costing
* Maintenance report writing

# MAINTAIN OIL PIPELINE MAINLINE PUMPS

**UNIT CODE: OG/OS/MM/CR/02/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to maintain oil pipeline mainline pumps. It involves preparing for the maintenance task, setting up maintenance tools and equipment, using appropriate personal protective equipment (PPE), performing pump maintenance to required specifications, test-run and commission serviced pump and complete workplace processes.

This unit standard applies to oil and gas industry.

.

**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. Prepare for pump maintenance
 | * 1. Pump maintenance requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required maintenance service is identified from defect notification (equipment defect report
	4. Scheduled maintenance service is identified from planned preventive maintenance chart
	5. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	6. Materials appropriate for the job are identified and located
	7. Permit to work is processed as per workplace procedures
 |
| 1. Carry out pump maintenance
 | * 1. Correct information is accessed and interpreted from appropriate

manufacturer’s instructions manual.* 1. Maintenance is performed as per task requirements and workplace procedures
	2. Tests on sub-assemblies are conducted according to workplace procedures
 |
| 1. Perform pump functional tests
 | * 1. Pump is test run as per workplace procedures
	2. Pump operational parameters are documented and analysed as per workplace procedures
 |
| 1. Complete pump maintenance
 | * 1. Pump is handed over to user as per workplace procedure
	2. Work is completed and appropriate personnel notified in accordance with workplace procedures
	3. Pump maintenance report is prepared and shared with appropriate personnel as per workplace procedure
	4. Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored
 |

**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** |
| --- | --- |
| Tools and equipment include but are not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Lifting equipment
* Technician toolbox
* Shaft alignment kit
* Bearing handling kit
* Seal lapping machine
 |
| Safety and environmental requirements include but not limited to: | * Occupational Safety and Health Act, 2007
* Environmental Management and Coordination Act, 1999
 |
| Materials include but not limited to: | * Lubricants
* Pump spare parts
* Cleaning materials
 |
| Mainline pumps are limited to: | * Ebara and flowserve mainline pumps
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required knowledge**

The section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* + Safe working practices and procedures to be followed when preparing for mainline pump maintenance
	+ Permit to work system
	+ Applicable legislations
	+ Hazards associated with mainline pump maintenance and how they can be minimized
	+ Personnel protective equipment worn while carrying out pump maintenance
	+ Types of maintenance for oil mainline pumps
	+ Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
	+ Types, sizes, capacities and capabilities of pumps
	+ Types of pumps and pump drivers used in oil terminals and depots
	+ Terminology used for pump and pump performance
	+ How to isolate and prepare a pump for maintenance
	+ Actions to be taken by the performer and operator before pump maintenance
	+ Service and overhaul techniques for mainline pumps
	+ How to examine pump parts for defects - wear, corrosion, porosity, cracks
	+ Problems that can occur during pump maintenance and how they can be overcome
	+ Safe working practices and procedures to be followed when maintaining pump
	+ Types of mechanical seals and their applications
	+ Bearings, lubrication, and applications
	+ How to perform shaft alignment on pump and driver
	+ Visual examination of pump casing, wear rings, shaft and impeller
	+ Procedures for reassembly of the pump
	+ Procedure for test running a pump after maintenance
	+ Normal pump operating characteristics – vibrations, temperature, flow-rate, pressure, speed, mountings, pump performance curve
	+ Procedure for testing quality of maintenance using pump parameters
	+ Equipment handing over procedures after maintenance
	+ Maintenance costing
	+ Maintenance report writing

# MAINTAIN OIL PIPELINE PUMP-SET FLUID COUPLING

**UNIT CODE: OG/OS/MM/CR/03/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to maintain oil pipeline fluid coupling in oil pipelines. It involves preparing for the maintenance task, setting up maintenance tools and equipment, using appropriate personal protective equipment (PPE), performing fluid coupling maintenance to required specifications, test-run and commission serviced fluid coupling and complete workplace processes.

This unit standard applies to the oil and gas industry.

**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. Prepare for fluid coupling maintenance.
 | * 1. Fluid coupling maintenance requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required maintenance service is identified from defect notification (equipment defect report)
	4. Scheduled maintenance service is identified from planned preventive maintenance chart
	5. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	6. Materials appropriate for the job are identified and located
	7. Permit to work is processed as per workplace procedures
 |
| 1. Carry out fluid coupling maintenance
 | Correct information is accessed and interpreted from appropriate manufacturer’s instructions manual.* 1. Maintenance is performed as per task requirements and workplace procedures
	2. Tests on sub-assemblies are conducted according to workplace procedures
 |
| 1. Perform fluid coupling functional tests
 | * 1. Fluid coupling is test run as per workplace procedures
	2. Fluid coupling operational parameters are documented and analysed as per workplace procedures
 |
| 1. Complete fluid coupling maintenance
 | * 1. Fluid coupling is handed over to user as per workplace procedure
	2. Work is completed and appropriate personnel notified in accordance with workplace procedures
	3. Fluid coupling maintenance report is prepared and shared with appropriate personnel as per workplace procedure
	4. Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored
 |

**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:*** |
| --- | --- |
| Tools and equipment include but not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Lifting equipment
* Technician toolbox
* Shaft alignment kit
* Bearing handling kit
 |
| Safety and environmental requirements include but not limited to: | * Occupational Safety and Health Act, 2007
* Environmental Management and Coordination Act, 1999
 |
| Materials include but not limited to: | * Lubricants
* Fluid coupling spare parts
* Cleaning materials
 |
| Terminal fluid couplings are limited to: | * Voith and Hitachi fluid couplings
 |

**REQUIRED KNOWLEDGE**

The section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* + - Safe working practices and procedures to be followed when preparing for terminal fluid coupling maintenance
		- Permit to work system
		- Applicable legislations
		- Hazards associated with terminal fluid coupling maintenance and how they can be minimised
		- Personal protective equipment worn while carrying out fluid coupling maintenance
		- Types of maintenance for oil pipeline fluid couplings
		- Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
		- Types, sizes, capacities and capabilities of fluid couplings
		- Types of fluid couplings used in oil pipelines
		- Terminology used for fluid coupling and fluid coupling performance
		- How to isolate and prepare a fluid coupling for maintenance
		- Actions to be taken by the performer and operator before fluid coupling maintenance
		- Service and overhaul techniques for terminal fluid couplings
		- How to examine fluid coupling parts for defects; wear, corrosion, porosity, cracks
		- Problems that can occur during fluid coupling maintenance and how they can be overcome
		- Safe working practices and procedures to be followed when maintaining fluid coupling
		- Types of bearings, lubrication, and applications
		- How to perform shaft alignment on fluid coupling and driver
		- Procedures for reassembly of the fluid coupling
		- Procedure for test running a fluid coupling after maintenance
		- Normal fluid coupling operating characteristics – vibrations, temperature, pressure, speed, mountings, fluid coupling performance parameters
		- Procedure for testing quality of maintenance using fluid coupling parameters
		- Equipment handing over procedures after maintenance
		- Maintenance costing
		- Maintenance report writing

# PERFORM EQUIPMENT SHAFT ALIGNMENT

**UNIT CODE: OG/OS/MM/CR/04/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to plan and prepare for work activities, perform equipment shaft alignment troubleshoot any defect, repair, test-run and commission aligned equipment, handover equipment to user, clear worksite and write shaft alignment report and complete work as per workplace procedures.

This unit standard applies to the oil and gas and related industries.

**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. Prepare for shaft alignment
 | * 1. Shaft alignment requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required alignment method is identified from defect notification (equipment defect report)
	4. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	5. Materials appropriate for the job are identified and located
	6. Permit to work is processed as per workplace procedures
 |
| 1. Carry out shaft alignment
 | 2.1 Correct information is accessed and interpreted from appropriate manufacturer’s instructions manual.* 1. Shafts alignment is performed as per task requirements and workplace procedures
	2. Tests on sub-assemblies are conducted according to workplace instructions and quality requirements
 |
| 1. Perform shaft alignment functional tests
 | * 1. Aligned equipment is test run as per workplace procedures
	2. Equipment operational parameters are documented and analysed as per workplace procedures
 |
| 1. Complete shaft alignment
 | * 1. Equipment is handed over to user as per workplace procedure
	2. Work is completed and appropriate personnel notified in accordance with workplace procedures
	3. Shaft alignment report is prepared and shared with appropriate personnel as per workplace procedure
	4. Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored
 |

**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:*** |
| --- | --- |
| Tools and equipment include but are not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Technician toolbox
* Shaft alignment kit
 |
| Safety and environmental requirements include but are not limited to: | * Occupational Safety and Health Act 2007
* Environmental Management and Coordination Act 1999
 |
| Materials include but are not limited to: | * Lubricants
* Shaft alignment spare parts
* Cleaning materials
* Shims
 |
| Shaft alignment methods are limited to: | * Laser optical, reverse dial, face and rim
 |
| Related industries include but are not limited to: | * Manufacturing industries, marine industry, heavy machinery
 |

**REQUIRED KNOWLEDGE**

The section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* Safe working practices and procedures to be followed when preparing for shaft alignment
* Permit to work system
* Applicable legislations
* Hazards associated with shaft alignment and how they can be minimised
* Personal protective equipment worn while carrying out shaft alignment
* Shaft alignment methods
* Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
* Terminology used for shaft alignment
* How to isolate and prepare an equipment for shaft alignment
* Actions to be taken by the performer and operator before equipment shaft alignment
* How to examine shafts and couplings for defects - wear, corrosion, porosity, cracks
* Problems that can occur during shaft alignment and how they can be overcome
* Safe working practices and procedures to be followed when aligning shafts
* How to perform shaft alignment on equipment and driver
* Procedures for reassembly of the shaft alignment
* Procedure for test running an equipment after shaft alignment
* Procedure for testing alignment quality using equipment operational parameters
* Equipment handing over procedures after alignment
* Shaft alignment costing
* Shaft alignment report writing

# MAINTAIN OIL PIPELINE VALVES

**UNIT CODE: OG/OS/MM/CR/05/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to maintain oil product valves in oil pipelines. It involves preparing for the maintenance task, setting up maintenance tools and equipment, using appropriate personal protective equipment (PPE), performing valve maintenance to required specifications, test-run and commission serviced valve and complete workplace processes.

This unit standard applies to the oil and gas industry.

**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. Prepare for valve maintenance
 | * 1. Valve maintenance requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required maintenance service is identified from defect notification (equipment defect report)
	4. Scheduled maintenance service is identified from planned preventive maintenance chart
	5. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	6. Materials appropriate for the job are identified and located
	7. Permit to work is processed as per workplace procedures
 |
| 1. Carry out valve maintenance
 | * 1. Correct information is accessed and interpreted from appropriate

manufacturer’s instructions manual* 1. Maintenance is performed as per task requirements and workplace procedures

2.3 Tests on sub-assemblies are conducted according to workplace instructions and quality requirements |
| 1. Perform valve functional tests
 | * 1. Valve is test run as per workplace procedures
	2. Valve operational parameters are documented and analysed as per workplace procedures
 |
| 1. Complete valve maintenance
 | 4.1 Valve is handed over to user as per workplace procedure* 1. Work is completed and appropriate personnel notified in accordance with workplace procedures
	2. Valve maintenance report is prepared and shared with appropriate personnel as per workplace procedure
	3. Work area is cleaned, non- recyclable materials are disposed of, and recyclable material is collected and stored.
 |

**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:*** |
| --- | --- |
| Tools and equipment include but are not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Lifting equipment
* Technician toolbox
* Bearing handling kit
 |
| Safety and environmental requirements include but are not limited to: | * Occupational Safety and Health Act, 2007
* Environmental Management and Coordination Act, 1999
 |
| Materials include but are not limited to: | * Lubricants
* Valve spare parts
* Cleaning materials
 |
| Pipeline valves include but are not limited to: | Ball, gate, globe, check, pressure control, flow control, diaphragm,butterfly, pressure relief, pressure safety, hydrant pit |

**REQUIRED KNOWLEDGE**

This section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* + Safe working practices and procedures to be followed when preparing for pipeline valve maintenance
	+ Permit to work system
	+ Applicable legislations
	+ Hazards associated with pipeline valve maintenance and how they can be minimized
	+ Personal protective equipment worn while carrying out valve maintenance
	+ Types of maintenance for oil pipeline valves
	+ Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
	+ Types, sizes, capacities and capabilities of valves
	+ Types of valves and valve drivers used in oil pipelines and depots
	+ Terminology used for valve and valve performance
	+ How to isolate and prepare a valve for maintenance
	+ Actions to be taken by the performer and operator before valve maintenance
	+ Service and overhaul techniques for pipeline valves
	+ How to examine valve parts for defects - wear, corrosion, porosity, cracks
	+ Problems that can occur during valve maintenance and how they can be overcome
	+ Safe working practices and procedures to be followed when maintaining valve
	+ Types of valve seals and their applications
	+ Bearings, lubrication, and applications
	+ Visual examination of valve casing, wear rings, shaft and impeller
	+ Procedures for reassembly of the valve
	+ Procedure for test running a valve after maintenance
	+ Normal valve operating characteristics – vibrations, temperature, flow-rate, pressure, speed, mountings
	+ Procedure for testing quality of maintenance using valve parameters
	+ Equipment handing over procedures after maintenance
	+ Maintenance costing
	+ Maintenance report writing

# MAINTAIN OIL PIPELINE VALVE ACTUATORS

**UNIT CODE: OG/OS/MM/CR/06/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to maintain oil pipeline valve actuators in oil pipelines. It involves preparing for the maintenance task, setting up maintenance tools and equipment, using appropriate personal protective equipment (PPE), performing valve actuator maintenance to required specifications, test-run and commission serviced valve actuator and complete workplace processes.

This unit standard applies to the oil and gas industry..

**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. Prepare for valve actuator maintenance
 | * 1. Actuator maintenance requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required maintenance service is identified from defect notification (equipment defect report)
	4. Scheduled maintenance service is identified from planned preventive maintenance chart.
	5. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	6. Materials appropriate for the job are identified and located
	7. Permit to work is processed as per workplace procedures
 |
| 1. Carry out valve actuator maintenance
 | 2.1 Correct information is accessed and interpreted from appropriatemanufacturer’s instructions manual.2.2 Maintenance is performed as per task requirements and workplace procedures2.3 Tests on sub-assemblies are conducted according to workplace instructions and quality requirements |
| 3Perform valve actuator functional tests | * 1. Actuator is test run as per workplace procedures
	2. Actuator operational parameters are documented and analysed as per workplace procedures
 |
| 4 Complete valve actuator maintenance | 4.1 Actuator is handed over to user as per workplace procedure4.2 Work is completed and appropriate personnel notified in accordance with workplace procedures4.3 Actuator maintenance report is prepared and shared with appropriate personnel as per workplace procedure4.4 Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored |

**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:*** |
| --- | --- |
| Tools and equipment include but are not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Lifting equipment
* Technician toolbox
* Bearing handling kit
 |
| Safety and environmental requirements include but are not limited to: | * Occupational Safety and Health Act 2007
* Environmental Management and Coordination Act 1999
 |
| Materials include but are not limited to: | * Lubricants
* Valve actuator spare parts
* Cleaning materials
 |
| Pipeline valve actuators include butare not limited to: | Manual, electric, pneumatic, hydraulic, electro-pneumatic, electro-hydraulic |

**REQUIRED KNOWLEDGE**

This section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* Safe working practices and procedures to be followed when preparing for pipeline valve actuator maintenance
* Permit to work system
* Applicable legislations
* Hazards associated with pipeline valve actuator maintenance and how they can be minimized
* Personal protective equipment worn while carrying out valve actuator maintenance
* Types of maintenance for oil pipeline valve actuators
* Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
* Types, sizes, capacities and capabilities of valve actuators
* Types of valve actuators and valve actuator drivers used in oil pipelines
* Terminology used for valve actuators and valve actuator performance
* How to isolate and prepare a valve actuator for maintenance
* Actions to be taken by the performer and operator before valve actuator maintenance
* Service and overhaul techniques for pipeline valve actuators
* How to examine valve actuator parts for defects - wear, corrosion, porosity, cracks
* Problems that can occur during valve actuator maintenance and how they can be overcome
* Safe working practices and procedures to be followed when maintaining valve actuator
* Bearings, lubrication, and applications
* Visual examination of valve actuator drive bush, gearbox and drive mechanism
* Procedures for reassembly of the valve actuator
* Procedure for test running an actuator after maintenance
* Normal actuator operating characteristics – vibrations, temperature, mountings, valve actuator performance parameters
* Procedure for testing quality of maintenance using valve actuator parameters
* Equipment handing over procedures after maintenance
* Maintenance costing
* Maintenance report writing

# MAINTAIN OIL PIPELINE FLOW METERS

**UNIT CODE: OG/OS/MM/CR/07/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to maintain oil product flow meters in oil pipelines. It involves preparing for the maintenance task, setting up maintenance tools and equipment, using appropriate personal protective equipment (PPE), performing flow meter maintenance to required specifications, test-run and commission serviced flow meter and complete workplace processes

This unit standard applies to the oil and gas industry.

**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. Prepare for flow meter maintenance.
 | 1.1 Meter maintenance requirements are determined from workplace instructions1.2 Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations1.3 Required maintenance service is identified from defect notification (equipment defect report)1.4 Scheduled maintenance service is identified from planned preventive maintenance chart1.5 Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures1.6 Materials appropriate for the job are identified and located1.7 Permit to work is processed as per workplace procedures |
| 1. Carry out flow meter maintenance
 | 2.1 Correct information is accessed and interpreted from appropriatemanufacturer’s instructions manual.2.2 Maintenance is performed as per task requirements and workplace procedures2.3 Tests on sub-assemblies are conducted according to workplace instructions and quality requirements2 |
| 3 Perform flow meter functional tests | * 1. Meter is test run as per workplace procedures
	2. Meter operational parameters are documented and analysed as per workplace procedures
 |
| 4 Complete valve actuator maintenance | 4.1 Actuator is handed over to user as per workplace procedure4.2 Work is completed and appropriate personnel notified in accordance with workplace procedures4.3 Actuator maintenance report is prepared and shared with appropriate personnel as per workplace procedure4.4 Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored |

**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:*** |
| --- | --- |
| Tools and equipment include but are not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Lifting equipment
* Technician toolbox
* Bearing handling kit
* Meter test kit
 |
| Safety and environmental requirements include but are not limited to: | * Occupational Safety and Health Act, 2007
* Environmental Management and Coordination Act, 1999
 |
| Materials include but are not limited to: | * Lubricants
* Flow meter spare parts
* Cleaning materials
 |
| Oil pipeline flow meters are limited to: | Positive displacement, turbine and ultrasonic flow meters |

**REQUIRED KNOWLEDGE**

This section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* Safe working practices and procedures to be followed when preparing for pipeline flow meter maintenance
* Permit to work system
* Applicable legislations
* Hazards associated with pipeline flow meter maintenance and how they can be minimised
* Personal protective equipment worn while carrying out flow meter maintenance
* Types of maintenance for oil pipeline flow meters
* Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
* Types, sizes, capacities and capabilities of flow meters
* Types of flow meters and flow meter drivers used in oil pipelines and depots
* Terminology used for flow meter and flow meter performance
* How to isolate and prepare a flow meter for maintenance
* Actions to be taken by the performer and operator before flow meter maintenance
* Service and overhaul techniques for pipeline flow meters
* How to examine flow meter parts for defects - wear, corrosion, porosity, cracks
* Problems that can occur during flow meter maintenance and how they can be overcome
* Safe working practices and procedures to be followed when maintaining flow meter
* Bearings, lubrication, and applications
* Visual examination of flow meter casing, wear rings, shaft and impeller
	+ Procedures for reassembly of the flow meter
	+ Procedure for test running a flow meter after maintenance
	+ Normal flow meter operating characteristics – vibrations, temperature, flow-rate, pressure, speed, mountings, flow meter performance curve
	+ Procedure for testing quality of maintenance using flow meter parameters
	+ Equipment handing over procedures after maintenance
	+ Maintenance costing
	+ Maintenance report writing

# MAINTAIN OIL PRODUCT TANKS

**UNIT CODE: OG/OS/MM/CR/08/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to maintain oil product tanks in oil terminals. It involves preparing for the maintenance task, setting up maintenance tools and equipment, using appropriate personal protective equipment (PPE), performing product tank maintenance to required specifications, test and commission serviced tank and complete workplace processes.

This unit standard applies to the oil and gas industry.

**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. Prepare for product tank maintenance
 | * 1. Product tank maintenance requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required maintenance service is identified from defect notification (equipment defect report)
	4. Scheduled maintenance service is identified from planned preventive maintenance chart
	5. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	6. Materials appropriate for the job are identified and located
	7. Permit to work is processed as per workplace procedures
 |
| 1. Carry out product tank maintenance
 | * 1. Correct information is accessed and interpreted from appropriate

manufacturer’s instructions manual.* 1. Tank maintenance is performed as per task requirements and workplace procedures
	2. Maintenance of tank appurtenances is performed as per task requirements and workplace procedures
	3. Tests on sub-assemblies are conducted according to workplace instructions and quality requirements
 |
| 3 Perform product tank functional tests | * 1. Product tank is tested as per workplace procedures
	2. Tank operational parameters are documented and analysed as per workplace procedures
 |
| 4 Complete product tank maintenance | 4.1 Product tank is handed over to user as per workplace procedure4.2 Work is completed and appropriate personnel notified in accordance with workplace procedures 4.3 Product tank maintenance report is prepared and shared with appropriate personnel as per workplace procedure4.4 Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored |

**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:*** |
| --- | --- |
| Tools and equipment include but are not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Technician toolbox
* Cleaning tools
* Grit blasting equipment
* Painting equipment
* Paint measuring tools
 |
| Safety and environmental requirements include but are not limited to: | * Occupational Safety and Health Act, 2007
* Environmental Management and Coordination Act, 1999
 |
| Materials include but are not limited to: | * Lubricants
* Tank appurtenances spare parts
* Cleaning materials
* Paints
* Grit
 |
| Oil product tanks are limited to: | Cone roof, floating roof, underground/buried tanks |

**REQUIRED KNOWLEDGE**

This section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* + Safe working practices and procedures to be followed when preparing for product tank maintenance
	+ Permit to work system
	+ Applicable legislations
	+ Hazards associated with terminal product tank maintenance and how they can be minimised
	+ Personal protective equipment worn while carrying out product tank maintenance
	+ Types of maintenance for oil product tanks
	+ Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
	+ Types, sizes, capacities and capabilities of product tanks
	+ Types of product tanks and product tank drivers used in oil terminals and depots
	+ Terminology used for product tank and product tank performance
	+ How to isolate and prepare a product tank for maintenance
	+ Tank decommissioning procedures
	+ Actions to be taken by the performer and operator before product tank maintenance
	+ Service and overhaul techniques for product tank appurtenances
	+ How to examine product tank for defects - wear, corrosion, porosity, cracks
	+ Problems that can occur during product tank maintenance and how they can be overcome
	+ Safe working practices and procedures to be followed when maintaining product tank
	+ Types of tank-side valves and their maintenance
	+ Bearings, lubrication, and applications
	+ Tank cleaning procedures
	+ Visual examination of product tank shell
	+ Measurement of tank shell thickness
	+ Grit blasting procedures
	+ Tank painting procedures
	+ Procedures for boxing up of the product tank
	+ Procedure for test a product tank after maintenance
	+ Normal product tank operating characteristics – temperature, filling-rate,
	+ Floating suctions operation and maintenance
	+ Procedure for testing quality of maintenance using product tank parameters
	+ Equipment handing over procedures after maintenance
	+ Maintenance costing
	+ Tank maintenance report writing

# PERFORM OIL PIPELINE MAINTENANCE

**UNIT CODE: OG/OS/MM/CR/09/5/A**

**UNIT DESCRIPTION**

The unit standard specifies the competencies required to plan and prepare for work activities, perform oil pipeline pigging, sleeving and coating, troubleshoot cause of defects, repair, and test pipeline, handover line to user, clear worksite, write pipeline maintenance report and complete work as per workplace procedures.

This unit standard applies to oil and gas pipelines.

**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. Prepare for pipeline maintenance
 | * 1. Pipeline maintenance requirements are determined from workplace instructions
	2. Safety and environmental requirements are followed in accordance with workplace procedures and statutory obligations
	3. Required maintenance service is identified from defect notification (equipment defect report)
	4. Scheduled maintenance service is identified from planned preventive maintenance chart
	5. Tools and equipment are selected, checked for serviceability and any faults rectified as per workplace procedures
	6. Materials appropriate for the job are identified and located
	7. Permit to work is processed as per workplace procedures
 |
| 1. Carry out pipeline maintenance
 | * 1. Correct information is accessed and interpreted from appropriate

manufacturer’s instructions manual* 1. Maintenance is performed as per task requirements and workplace procedures
	2. Tests on pipeline are conducted according to workplace instructions and quality requirements
 |
| 1. Perform pipeline functional tests
 | * 1. Pipeline is test run as per workplace procedures
	2. Pipeline operational parameters are documented and analysed as per workplace procedures
 |
| 4 Complete pipeline maintenance | * 1. Pipeline is handed over to user as per workplace procedure
	2. Work is completed and appropriate personnel notified in accordance with workplace procedure
	3. Pipeline maintenance report is prepared and shared with appropriate personnel as per workplace procedure
	4. Work area is cleaned, non-recyclable materials are disposed of, and recyclable material is collected and stored
 |

**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:*** |
| --- | --- |
| Tools and equipment include but are not limited to: | * Personal protective equipment (PPE)
* Hand tools
* Technician toolbox
* Welding equipment
* Pipeline pigs
* Power tools
 |
| Safety and environmental requirements include but are not limited to: | * Occupational Safety and Health Act, 2007
* Environmental Management and Coordination Act, 1999
 |
| Materials include but are not limited to: | * Pipeline sleeves
* Pipeline spare parts
* Cleaning materials
 |
| Pipeline maintenance is limited to: | Pigging, sleeving and coating |

**REQUIRED KNOWLEDGE**

This section describes the required knowledge which supports performance. This knowledge will need to be considered in the learning and assessment process.

The individual needs to demonstrate knowledge of:

* + Safe working practices and procedures to be followed when preparing for pipeline maintenance
	+ Permit to work system
	+ Conducting job safety analysis before pipeline maintenance
	+ Applicable legislations
	+ Hazards associated with pipeline maintenance and how they can be minimized
	+ Personal protective equipment worn while carrying out pipeline maintenance
	+ Types of maintenance for oil pipelines
	+ Reading and interpretation of manufacturer’s instructions manual, engineering drawings and specifications
	+ Types, sizes, capacities and capabilities of pipelines
	+ Terminology used for pipeline and pipeline maintenance
	+ Actions to be taken by the performer and operator before pipeline maintenance
	+ Pipeline pigging procedures
	+ Pipeline sleeving procedures
	+ Pipeline welding procedures
	+ Pipeline coating procedures
	+ Pipeline stoppling procedures
	+ How to examine pipelines for internal/external defects - wear, corrosion, porosity, cracks
	+ Problems that can occur during pipeline maintenance and how they can be overcome
	+ Safe working practices and procedures to be followed when maintaining pipeline
	+ Visual examination and measurements carried out on pipeline pigs
	+ Procedure for test running a pipeline after maintenance
	+ Normal pipeline operating characteristics – temperature, flow- rate, pressure, pipeline performance specifications
	+ Procedure for testing quality of maintenance using pipeline parameters
	+ Pipeline handing over procedures after maintenance
	+ Maintenance costing
	+ Pipeline maintenance report writing