



REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARDS

FOR

MANUAL METAL ARC AND GAS METAL ARC WELDER – OPTION

LEVEL 4



**TVET CDACC
P.O. BOX 15745-00100
NAIROBI**

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This is a review of the Welding and Fabrication level 4 Occupational standards that was published in 2017

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FOREWORD

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

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted 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 Occupational Standards were developed for the purpose of developing a competency-based curriculum for Welding and Fabrication Level 4. These Occupational Standards will also be the basis for assessment of an individual for competence certification.

It is my conviction that these Occupational Standards will play a great role towards development of competent human resource for the Welding and Fabrication 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 14 of 2012 on Reforming Education and Training in Kenya, 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 Welding Sector Skills Advisory Committee (SSAC), have developed these Occupational Standards for a Welding and Fabrication artisan. These occupational standards will be the basis for development of competency-based curriculum for Welding and Fabrication Level 4. These Standards will also be the basis for assessment of an individual for competence certification.

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

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

CHAIRPERSON, TVET CDACC

ACKNOWLEDGEMENT

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

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

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

CHAIRPERSON
WELDING SECTOR SKILLS ADVISORY COMMITTEE

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ABBREVIATIONS AND ACRONYMS

ASME	American Society of Mechanical Engineers
BC	Basic Competency
BS	British Standard
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
ISO	International Organization for Standardization
KCSE	Kenya Certificate of Secondary Education
KNQA	Kenya National Qualifications Authority
KS	Kenyan Standard
MoE	Ministry of Education
NEMA	National Environmental Management Authority
NGO	Non-Governmental Organization
OS	Occupational Standards
OSHA	Occupation Safety and Health Act
PPE	Personal Protective Equipment
SOPs	Standard Operating Procedures
SSAC	Sector Skills Advisory Committee
WEF	Welding and Fabrication

KEY TO UNIT CODE

ENG /OS/WEF/BC /01/4/A

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

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OVERVIEW

Welding (Manual Metal Arc and Gas Metal Arc Welding -option) level 4 qualification consists of competencies that a person must achieve to enable him/her to carry out various welding processes including manual metal arc welding, and Gas Metal Arc Welding.

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

Basic Units of Competency

Common Units of Competency

Core Units of Competency

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BASIC COMPETENCIES

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DEMONSTRATE COMMUNICATION SKILLS UNIT CODE: COS/OS/HD/BC/01/4/A UNIT

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

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function

PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. Bold and italicized terms are elaborated in the Range 1.

1. Obtain and convey workplace information

- 1.1 Specific and relevant information is accessed from appropriate sources based on standard procedures
- 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information based on communication needs
- 1.3 Appropriate medium is used to transfer information and ideas in accordance with workplace guidelines
- 1.4 Appropriate non- verbal communication is used as per the communication needs
- 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed based on workplace requirements
- 1.6 Location and storage of information is undertaken according to workplace procedures

2. Complete relevant work-related documents

- 2.1 Range of forms relating to conditions of employment are completed according to workplace procedures
- 2.2 Workplace data is recorded based on workplace requirements
- 2.3 Errors in recording information are identified and acted upon in accordance with workplace policies
- 2.4 Reporting requirements are completed according to organizational guidelines

3. Communicate information about workplace processes

- 3.1 Information sources are identified according to workplace procedures
- 3.2 Methods of communication are selected based on workplace guidelines
- 3.3 Multiple operations are communicated according to workplace structure
- 3.4 Work-related questions are asked and responded based on set protocols
- 3.5 Information is selected and organized according to workplace requirements

4. Lead workplace discussions

- 4.1 Verbal and written reporting is undertaken as per workplace requirements
- 4.2 Communication is maintained according to workplace standards
- 4.3 Response to workplace issues are sought and provided as per workplace protocol
- 4.4 Constructive contributions are made based on workplace discussions
- 4.5 Workplace objectives and action plan are communicated according to workplace requirements

5. Identify and communicate issues arising in the workplace

- 5.1 Issues and problems are identified as per workplace guidelines
- 5.2 Problems and issues in the workplace are organized according to workplace operations
- 5.3 Dialogue is initiated with appropriate personnel as per workplace structure
- 5.4 Problems and issues raised are communicated as per the workplace reporting procedures

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

Variable Range 1. Methods of communication may include but not limited to:

- Non-verbal gestures
- Verbal
- Face to face
- Two-way radio
- Speaking to groups
- Using telephone
- Written
- Internet

2. Workplace discussion may include but not limited to:

Coordination meetings • Toolbox discussion • Peer-to-peer discussion ©TVET CDACC 2018 3

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit of competency. **Required Skills** The individual needs to demonstrate the following skills:

- Communication
- Active listening
- Interpretation
- Negotiation
- Writing

Required Knowledge The individual needs to demonstrate knowledge of:

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

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

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

- 1.1 Dealt with a range of communication/information at one time
- 1.2 Made constructive contributions in workplace issues
- 1.3 Sought workplace issues effectively
- 1.4 Responded to workplace issues promptly
- 1.5 Presented information clearly and effectively in written form
- 1.6 Used appropriate sources of information
- 1.7 Asked appropriate questions
- 1.8 Provided accurate information

2. Resource Implications

- 2.1 Access to relevant workplace where assessment can take place
- 2.2 Appropriately simulated environment where assessment can take place
- 2.3 Materials relevant to the proposed activity or tasks

3. Methods of Assessment

- 3.1 Third-party reports
- 3.2 Portfolio
- 3.3 Interview
- 3.4 Written tests
- 3.5 Observation
- 3.6 Oral questioning

4. Context of Assessment Competency may be assessed

- 4.1 On the job ©TVET CDACC 2018 4
- 4.2 Off the job
- 4.3 During industrial attachment

5. Guidance information for assessment Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. ©TVET CDACC 2018 5

DEMONSTRATE NUMERACY SKILLS UNIT CODE: COS/OS/HD/BC/02/4/A UNIT DESCRIPTION This unit covers the competencies required to demonstrate numeracy skills. It involves identifying and using whole numbers and simple fractions, decimals and percentages for work, identifying, measuring and estimating familiar quantities for work, reading and using familiar maps, plans and diagrams for work, identifying and describing common 2D and some 3D shapes for work, constructing simple tables and graphs for work using familiar data and identifying and interpreting information in familiar tables, graphs and charts for work

ELEMENTS AND PERFORMANCE CRITERIA **ELEMENT** These describe the key outcomes which make up workplace function. **PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. Bold and italicized terms are elaborated in the Range.

1. Identify and use whole numbers and simple fractions, decimals and percentages for work
- 1.1 Simple fractions, decimals and percentages identified and interpreted as per standard operating procedures.
- 1.2 Understanding of place value by organising numbers from smallest to largest demonstrated as SOPs
- 1.3 Required numerical information located and decision made on appropriate method to solve a problem as per SOPs
- 1.4 Limited range of calculations performed using the four operations using SOPs
- 1.5 Links between operations described as per SOPs
- 1.6 Estimations made to check reasonableness of results of problemsolving process as SOPs
- 1.7 Numerical information recorded, and the result of the task communicated using informal and some formal language and symbolism as per workplace

procedures©TVET CDACC 2018 6 2. Identify, measure and estimate familiar quantities for work

2.1 Measurement information in workplace tasks and texts identified and interpreted as per workplace procedures. 2.2 Familiar units of measurement needed for tasks is identified as per measurements manuals/charts 2.3 Familiar and simple amounts estimated as per workplace procedures. 2.4 Appropriate measuring equipment selected as per SOPs 2.5 Simple measuring equipment graduated in familiar units to measure relevant quantities is used as per graduation manuals. 2.6 Calculation done using familiar units of measurement as per SOPs 2.7 Measurements and results checked against estimates as per job specifications. 2.8 Results are recorded or reported as per workplace procedures 2.9 Results relevant to the workplace task are communicated using informal and some formal mathematical and general language as per workplace procedures. 3. Read and use familiar maps, plans and diagrams for work 3.1 Items and places are in familiar maps, plans and diagrams as per SOPs 3.2 Common symbols and keys recognised in familiar maps, plans and diagrams as per SOPs 3.3 Understanding of direction and location demonstrated by describing the location of objects, or route to familiar places as per SOPs 3.4 Instructions to locate familiar objects or places are given and followed as per SOPs 3.5 Informal and some formal oral mathematical language and symbols are used as per SOPs 4. Identify and describe common 2D and some 3D shapes for work 4.1 Common 2D shapes and some common 3D shapes in familiar situations are identified and named as per job requirements 4.2 Common 2D shapes and designs are compared and classified as per SOPs 4.3 Informal and some formal language used to describe common two-dimensional shapes and some common three-dimensional shapes in accordance with workplace procedures. 4.4 Simple items used to draw or construct common 2D shapes as per workplace procedures. 4.5 Common 3D shapes matched to their 2D sketches or nets as per SOPs©TVET CDACC 2018 7 5. Construct simple tables and graphs for work using familiar data 5.1 Common types of graphs are identified and named as per SOPs 5.2 Familiar data to be collected is determined in accordance with job specifications. 5.3 A method to collect data is selected in accordance with workplace procedures. 5.4 A small amount of simple familiar data is collected as per workplace procedures 5.5 One or two variables determined from the data collected as per SOPs. 5.6 Data ordered and collated as per standard operating procedures. 5.7 A table is constructed and data entered as per SOPs 5.8 Graphs are constructed using data from table as per job specifications 5.9 Results are promptly checked as per workplace procedures 5.10 Graph information related to work is reported or discussed using informal and some formal mathematical and general language as per workplace procedures 6. Identify and interpret information in familiar tables, graphs and charts for work 6.1 Simple tables are identified in familiar texts and contexts in accordance with workplace procedures 6.2 Title, headings, rows and columns located in familiar tables as per SOPs 6.3 Information and data in simple tables identified and interpreted as per workplace procedures. 6.4 Information is related in accordance with workplace tasks 6.5 Familiar graphs and charts are identified in familiar texts and contexts as per SOPs 6.6 Title, labels, axes, scale and key from familiar graphs and charts are located as per SOPs 6.7 Information and data in familiar graphs and charts are identified and interpreted as per job requirements 6.8

Information is related to relevant workplace tasks as per job requirements. RANGE This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance. Variable Range 1. Simple measuring equipment may include but not limited to: • Rulers • Watches/clocks • Scales • Thermometers • AVO meter ©TVET CDACC 2018 8 2. Common 2D shapes and common 3D shapes may include but not limited to: • Round • Square • Rectangular • Triangle • Sphere • Cylinder • Cube • Polygons • Cuboids REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit of competency. Required Skills The individual needs to demonstrate the following skills: • Measuring • Logical thinking • Computing • Drawing of graphs • Applying mathematical formulas • Analytical Required knowledge The individual needs to demonstrate knowledge of: • Types of common shapes • Differentiation between two dimensional shapes / objects • Formulae for calculating area and volume • Types and purpose of measuring instruments • Units of measurement and abbreviations • Fundamental operations (addition, subtraction, division, multiplication) • Rounding techniques • Types of fractions • Different types of tables and graphs • Meaning of graphs, such as increasing, decreasing, and constant value • Preparation of basic data, tables & graphs EVIDENCE GUIDE This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range. 1. Critical aspects of Competency Assessment requires evidence that the candidate: 1.1 Simple fractions, decimals and percentages are correctly identified and interpreted 1.2 Performed a limited range of calculations using the 4 operations 1.3 Performed calculations using familiar units of measurement ©TVET CDACC 2018 9 1.4 Recognised common symbols and keys in familiar maps, plans and diagrams 1.5 Constructed simple tables and graphs using familiar data 1.6 Identified and interpret information in familiar tables, graphs and charts 2. Resource Implications 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place 2.3 Materials relevant to the proposed activity or tasks 3. Methods of Assessment Competency may be assessed through: 3.1 Written Test 3.2 Interview 3.3 Oral Questioning 4. Context of Assessment Competency may be assessed 4.1 On the job 4.2 Off the job 4.3 During industrial attachment 5. Guidance information for assessment Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. ©TVET CDACC 2018 10 DEMONSTRATE DIGITAL LITERACY UNIT CODE: COS/OS/HD/BC/03/4/A UNIT DESCRIPTION This unit covers the competencies required to demonstrate digital literacy in a working environment. It entails identifying computer software and hardware, applying security measures to data, hardware, software, applying computer software in solving task sand applying internet and email in communication at workplace. ELEMENTS AND PERFORMANCE CRITERIA ELEMENT These describe the key outcomes which make up workplace function PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. Bold and italicized terms are elaborated in the Range 1. Identify computer software and hardware 1.1 Appropriate computer software is identified according to manufacturer’s specification 1.2 Appropriate computer

hardware is identified according to manufacturer's specification 2. Apply security measures to data, hardware, software 2.1 Data security and privacy are classified in accordance with the technological situation 2.2 Security and control measures are applied in accordance with laws governing protection of ICT 2.3 Computer threats and crimes are detected as per information security management guidelines. 2.4 Protection against computer crimes is undertaken in accordance with laws governing protection of ICT 3. Apply computer software in solving tasks 3.1 Basic word processing concepts are applied in resolving workplace tasks 3.2 Word processing utilities are applied in accordance with workplace procedures 3.3 Data is manipulated on worksheet in accordance with office procedures 4. Apply internet and email in communication at workplace 4.1 Electronic mail is applied in workplace communication in accordance with office procedures 4.2 Office internet functions are defined and executed in accordance with office procedures 4.3 Network configuration and uses are determined in accordance with office operations procedures

RANGE This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance. Range Variable ©TVET CDACC 2018 11

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

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit of competency. Required Skills The individual needs to demonstrate the following skills:

- Analytical
- Interpretation
- Typing
- Communication
- Computing

Required Knowledge The individual needs to demonstrate knowledge of:

- Input and output devices
- Central processing Unit (CPU)
- Peripherals
- Storage Media
- Software concept
- Types of concept
- Function of computer software
- Data security and privacy
- Security threats and control measures
- Computer crimes
- Detection and protection of computer crimes ©TVET CDACC 2018 12
- Laws governing protection of ICT
- Word processing; ✓ Functions and concepts of word processing. ✓ Documents and tables creation and manipulations ✓ Mail merging ✓ Word processing utilities • Spread sheet; ✓ Meaning, formulae, function and charts, uses, layout, data manipulation and application to cell • Networking and Internet; ✓ Meaning, functions and uses of networking and internet. ✓ Electronic mail and world wide web • Emerging trends and issues in ICT; ✓ Identify and apply emerging trends and issues in ICT ✓ Challenges posed by emerging trends and issues

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

1. Critical Aspects of Competency Assessment requires evidence that the candidate:
 - 1.1 Identified input, output, CPU

and storage media devices of computers in accordance to computer specification 1.2 Identified concepts, types and functions of computer software according to operation manual 1.3 Identified and controlled security threats 1.4 Detected and protected computer crimes 1.5 Applied word processing in office tasks 1.6 Prepared work sheet and applied data to the cells in accordance to workplace procedures 1.7 Used Electronic Mail for office communication as per workplace procedure 1.8 Applied internet and World Wide Web for office tasks in accordance with office procedures 1.9 Applied laws governing protection of ICT 2. Resource Implications 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place 2.3 Materials relevant to the proposed activity or tasks 3. Methods of Assessment Competency may be assessed through: 3.1 Written tests 3.2 Practical assignment 3.3 Interview 3.4 Oral Questioning ©TVET CDACC 2018 13 3.5 Observation 4. Context of Assessment Competency may be assessed 4.1 On the job 4.2 Off the job 4.3 During industrial attachment 5. Guidance information for assessment Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. ©TVET CDACC 2018 14 DEMONSTRATE ENTREPRENEURIAL SKILLS UNIT CODE: COS/OS/HD/BC/04/4/A UNIT DESCRIPTION This unit covers the competencies required demonstrate entrepreneurial skills. It involves creating and maintaining small scale business, establishing small scale business customer base, managing small scale business and growing/ expanding small scale business. ELEMENTS AND PERFORMANCE CRITERIA ELEMENT These describe the key outcomes which make up workplace function. PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. Bold and italicized terms are elaborated in the Range 1. Create and maintain small scale business 1. 1Generation and evaluation of business ideas is undertaken in accordance with the existing procedure 1. 2Competencies are matched with business opportunities in accordance with business practices. 1. 3Procedure for starting a small business is identified as per the legal requirements 1. 4SWOT/PESTEL analysis and or industrial survey is carried out according to office procedures 1. 5Business operations are monitored and controlled following established procedures. 1. 6Quality assurance measures are implemented in accordance with the business practices. 1. 7Good relations are maintained with staff/workers as per the workplace policies. 1. 8Policies and procedures on occupational safety and health and environmental concerns are constantly observed as per the workplace policies 2. Establish small scale business customer base 2. 1Good customer relations are maintained in accordance with office procedures 2. 2New customers and markets are identified, explored and reached out to according to the marketing plan 2. 3Promotions/Incentives are offered to loyal customers in accordance with office procedures 2. 4Additional products and services are evaluated and tried in accordance with marketing strategy 2. 5Customer record is maintained in accordance with office procedures 3. Manage small scale business 3.1 Enterprise is built up and sustained in line with judicious control of cash flows. 3.2 Profitability of enterprise is ensured as per the internal controls. 3.3 Unnecessary or lower-priority expenses and purchases are avoided as per the marketing strategy ©TVET CDACC 2018 15 3.4 Basic cost-benefit analysis are undertaken in accordance with office procedures 3.5 Basic

financial management are undertaken in accordance with office procedures 3.6 Basic financial accounting in undertaken in accordance with office procedures 3.7 Business internal controls are implemented in accordance with office procedure 3.8 Setting business priorities and strategies is carried out according to office procedures 3.9 Preparation and interpretation of basic financial statements is undertaken in accordance with set procedures 3.10 Preparation of business plans for small business is undertaken in accordance with business strategy 3.11 Business Social Responsibility is maintained in accordance with Standard Operations Procedures (SOP) 4. Grow/ expand small scale business 4.1 Prepared business growth strategy for small sale business in accordance with office procedures 4.2 Incorporated technology in small scale business growth in accordance with technological trends 4.3 Emerging issues and trends are considered in accordance with business growth strategy 4.4 Built audience interest in product/service according to growth strategy 4.5 Boosted cooperate communication according to business communication strategy

RANGE This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance. Variable Range 1. Business operations may include but not limited to: • Purchasing • Accounting/administrative • Work production/operations/sales • Marketing 2. Internal control may include but not limited to: • Accounting systems • Financial statements/reports • Cash management • Human resource management 3. Business Strategy may include but not limited to: • Management of wastages • Environmental Conservation ©TVET CDACC 2018 16 4. Communication strategy may include but not limited to: • Blue print of exchange of information • Technology and exchange of information

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit of competency. Required Skills The individual needs to demonstrate the following skills: • Marketing • Advertising • Basic bookkeeping • Accounting • Communication Required Knowledge The individual needs to demonstrate knowledge of: • Generation and evaluation of business ideas • Legal requirements for starting a small business • SWOT/ PESTEL analysis • Occupational Safety and Health • Public relations concepts • Business plan • Business financing • Marketing strategies • Business management and control • Production/ operation process • Product promotion strategies • Market and feasibility studies • Business ethics • Building customer relations • Business models and strategies • Types and categories of businesses • Business internal controls • Relevant national and local legislation and regulations • Basic quality control and assurance concepts • Building relations with customer and employees • Building competitive advantage of the enterprise • Business growth strategies

EVIDENCE GUIDE This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range. ©TVET CDACC 2018 17 1. Critical aspects of Competency Assessment requires evidence that the candidate: 1.1 Demonstrated entrepreneurial skills 1.2 Demonstrate competencies to create a small-scale business 1.3 Demonstrated ability to conceptualize and plan a micro/small business 1.4 Grew customer base for the small-scale business 1.5 Demonstrated ability to manage/operate a micro/small-scale business 1.6 Demonstrated competencies to grow a micro/small-scale business 2. Resource

Implications The following resources should be provided: 2.1 Assessment location 2.2 Case studies on micro/small-scale enterprises 2.3 Assessment materials 3. Methods of Assessment Competency in this unit may be assessed through: 3.1 Written tests 3.2 Observation 3.3 Oral questioning 3.4 Portfolio 3.5 Projects 4. Context of Assessment Competency may be assessed 4.1 On the job 4.2 Off the job 4.3 During industrial attachment 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:

COS/OS/HD/BC/05/4/A UNIT DESCRIPTION This unit covers competencies required to demonstrate employability skills. It involves conducting selfmanagement, demonstrating critical safe work habits, demonstrating workplace learning and workplace ethics. ELEMENTS AND PERFORMANCE CRITERIA ELEMENT These describe the key outcomes which make up workplace function. PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. Bold and italicized terms are elaborated in the Range 1. Conduct selfmanagement 1.1 Personal vision, mission and goals are formulated based on potential and in relation to organization objectives ©TVET CDACC 2018 18 1.2 Emotional intelligence is demonstrated as per workplace requirements. 1.3 Individual performance is evaluated and monitored according to the agreed targets. 1.4 Assertiveness is developed and maintained based on the requirements of the job. 1.5 Accountability and responsibility for own actions are demonstrated based on workplace instructions. 1.6 Self-esteem and a positive self-image are developed and maintained based on values. 1.7 Time management, attendance and punctuality are observed as per the organization policy. 1.8 Goals are managed as per the organization's objective 1.9 Self-strengths and weaknesses are identified based on personal objectives 2. Demonstrate critical safe work habits 2.1. Stress is managed in accordance with workplace policy. 2.2. Punctuality and time consciousness is demonstrated in line with workplace policy. 2.3. Personal objectives are integrated with organization goals based on organization's strategic plan. 2.4. Resources are utilized in accordance with workplace policy. 2.5. Work priorities are set in accordance to workplace goals and objectives. 2.6. Leisure time is recognized and utilized in line with personal objectives. 2.7. Drugs and substances of abuse are identified and avoided based on workplace policy. 2.8. HIV and AIDS prevention awareness is demonstrated in line with workplace policy. 2.9. Safety consciousness is demonstrated in the workplace based on organization safety policy. 2.10. Emerging issues are identified and dealt with in accordance with organization policy. 3. Demonstrate workplace learning 3.1 Learning opportunities are sought and managed based on job requirement and organization policy. 3.2 Improvement in performance is demonstrated based on courses attended. 3.3 Application of learning is demonstrated in both technical and nontechnical aspects based on requirements of the job 3.4 Time and effort is invested in learning new skills based on job requirements 3.5 Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy. ©TVET CDACC 2018 19 3.6 New systems are developed and maintained in accordance with the requirements of the job. 3.7 Awareness of personal role in workplace innovation is demonstrated based on requirements of the job. 4. Demonstrate workplace ethics

4.1 Policies and guidelines are observed as per the workplace requirements 4.2 Self-worth and professionalism is exercised in line with personal goals and organizational policies 4.3 Code of conduct is observed as per the workplace requirements 4.4 Integrity is demonstrated as per legal requirement

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

Range Variable 1. Personal objectives may include but not limited to: • Long term • Short term • Broad • Specific

2. Feedback may include but not limited to: • Verbal • Written • Informal • Formal

3. Team may include but not limited to: • Small work group • Staff in a section/department • Inter-agency group

4. Drug and substance abuse may include but not limited to: • Alcohol • Tobacco • Miraa • Over-the-counter drugs • Cocaine • Bhang • Glue

5. Emerging issues may include but not limited to: • Terrorism • Social media • National cohesion • Open offices

6. Range of media for learning may include but not limited to: • Mentoring • peer support and networking • IT and courses

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7. Innovation may include but not limited to: • New ideas • Original ideas • Different ideas • Methods/procedures • Processes • New tools

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit of competency.

Required Skills The individual needs to demonstrate the following skills: • Communication • Interpersonal • Critical thinking • Observation • Organizing • Record keeping • Problem solving • Decision Making • Resource utilization

Required Knowledge The individual needs to demonstrate knowledge of: • Work values and ethics • Company policies • Company operations, procedures and standards • Occupational Health and safety procedures • Fundamental rights at work • Personal hygiene practices • Workplace communication • Concept of time • Time management • Decision making • Types of resources • Work planning • Record keeping • Workplace problems and how to deal with them • Assertiveness • Team work • HIV and AIDS • Drug and substance abuse

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• Safe work habits • Professional growth and development • Technology in the workplace

Emerging issues o Social media o Terrorism o 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:

1.1 Conducted self-management 1.2 Demonstrated critical safe work habits 1.3 Demonstrated workplace learning 1.4 Demonstrated workplace ethics

2. Resource Implications The following resources should be provided: 2.1. Access to relevant workplace where assessment can take place 2.2. Appropriately simulated environment where assessment can take place

3. Methods of Assessment Competency in this unit may be assessed through: 3.1 Oral questioning 3.2 Portfolio of evidence 3.3 Third Party Reports 3.4 Written tests

4. Context of Assessment Competency may be assessed 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment 5. Guidance information for assessment Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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DEMONSTRATE ENVIRONMENTAL LITERACY UNIT CODE: COS/OS/HD/BC/06/4/A UNIT DESCRIPTION This unit specifies the competencies required to demonstrate environmental literacy. It involves controlling environmental hazard, controlling environmental pollution,

demonstrating sustainable resource use and evaluating current practices in relation to resource usage. **ELEMENTS AND PERFORMANCE CRITERIA ELEMENT** These describe the key outcomes which make up workplace function. **PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. Bold and italicized terms are elaborated in the Range

1. Control environmental hazard

1.1 Storage methods for environmentally hazardous materials are followed according to environmental regulations and OSHS.

1.2 Disposal methods of hazardous wastes are followed according to environmental regulations and OSHS.

1.3 PPE is used according to OSHS.

2. Control environmental pollution

2.1 Environmental pollution control measures are compiled following standard protocol.

2.2 Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999

2.3 Methods for minimizing noise pollution complied following environmental regulations.

3. Demonstrate sustainable use of resource s

3.1 Methods for minimizing wastage are complied with.

3.2 Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle)

3.3 Methods for economizing or reducing resource consumption are practiced.

4. Evaluate current practices in relation to resource usage

4.1 Information on resource efficiency systems and procedures are collected and provided as per work groups/sector

4.2 Current resource usage is measured and recorded as per work group/sector

4.3 Current purchasing strategies are analyzed and recorded according to industry procedures.

4.4 Current work processes to access information and data is analyzed following enterprise protocol.

5. Identify environmental legislations/conventions for environmental concerns

5.1 Environmental legislations/conventions and local ordinances are identified according to the different environmental aspects/impact

5.2 Industrial standard/environmental practices are described according to the different environmental concerns

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

Variable Range

1. PPE may include but are not limited to:

- Masks
- Gloves
- Goggles
- Safety hat
- Overall
- Hearing protector
- Safety boots

2. Environmental pollution control measures may include but are not limited to:

- Methods for minimizing or stopping spread and ingestion of airborne particles
- Methods for minimizing or stopping spread and inhaling gases and fumes
- Methods for minimizing or stopping spread and ingestion of liquid wastes

3. Waste management procedures may include but are not limited to:

- Sorting
- Storing of items
- Recycling of items
- Disposal of items
- Handling
- Transport

4. Current resources usage may include but are not limited to:

- Electric
- Water
- Fuel
- Telecommunications
- Supplies
- Materials

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit of competency.

Required Skills The individual needs to demonstrate the following skills:

- Measuring
- Recording
- Analytical
- Monitoring

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- Writing
- Communication

Required Knowledge The individual needs to demonstrate knowledge of:

- Storage methods of environmentally hazardous materials
- Disposal methods of hazardous wastes
- Usage of PPE
- Environmental regulations
- OSHS
- Types of pollution
- Environmental pollution control measures
- Different solid wastes
- Solid

waste management • Different noise pollution • Methods of minimizing noise pollution • Solid Waste Act • Methods of minimizing wastage • Waste management procedures • Economizing of resource consumption • Principle of 3Rs • Types of resources • Techniques in measuring current usage of resources • Calculating current usage of resources • Types of workplace environmental hazards • Environmental regulations • Environmental regulations applying to the enterprise. • Procedures for assessing compliance with environmental regulations. • Collection of information on environmental and resource efficiency systems and procedures, • Measurement and recording of current resource usage • Analysis and recording of current purchasing strategies. • Analysis current work processes to access information and data Analysis of data and information EVIDENCE GUIDE This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range. 1. Critical Aspects of Competency Assessment requires evidence that the candidate: 1.1 Controlled environmental hazards 1.2 Controlled environmental pollution 1.3 Demonstrated sustainable resource use 1.4 Evaluated current practices in relation to resource usage ©TVET CDACC 2018 25

2. Resource Implications The following resources should be provided: 2.1 Workplace with storage facilities 2.2 Tools, materials and equipment relevant to the tasks (e.g. cleaning tools, cleaning materials, trash bags, etc.) 2.3 PPEs 2.4 Manuals and references 2.5 Legislation, policies, procedures, protocols and local ordinances relating to environmental protection 2.6 Case studies/scenarios relating to environmental Protection 3 Methods of Assessment Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written tests 3.4 Third party reports 3.5 Portfolio 4 Context of Assessment Competency may be assessed 4.1 On the job 4.2 Off the job 4.3 During industrial attachment 5 Guidance information for assessment Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. ©TVET CDACC 2018 26 DEMONSTRATE OCUPATIONAL SAFETY AND HEALTH PRACTICES UNIT CODE: COS/OS/HD/BC/07/4/A UNIT DESCRIPTION This unit specifies the competencies required to practice safety and health and comply with OSH requirements relevant to work. It involves observing workplace procedures for hazards and risk prevention and participating in arrangements for workplace safety and health maintenance. ELEMENTS AND PERFORMANCE CRITERIA ELEMENT These describe the key outcomes which make up workplace function. PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. Bold and italicized terms are elaborated in the Range 1. Adhere to workplace procedures for hazards and risk prevention 1.1 Arrangement of work area and items in accordance with workplace procedures requirements 1.2 Work standards and procedures are followed based on instructions 1.3 Prevention and control measures are applied based on instructions 2. Participate in arrangements for workplace safety and health maintenance 2.1 Orientations on OSH requirements and regulations is undertaken in line with policy. 2.2 Feedback on occupational health and safety are provided as per workplace instructions. 2.3 Workplace procedures for reporting hazards, incidents, injuries and sickness are adhered to as per workplace policy. 2.4 OSH-related training needs are identified and proposed as per workplace policy. RANGE This section provides work

environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance. Variable Range 1. Prevention and control measures may include but are not limited to: • Eliminate the hazard • Isolate the hazard • Substitute the hazard with a safer alternative • Use administrative controls to reduce the risk • Use engineering controls to reduce the risk • Use personal protective equipment • Safety, Health and Work Environment Evaluation • Periodic and/or special medical examinations of workers ©TVET CDACC 2018 27 2. Safety gears /PPE (Personal Protective Equipment's) may include but are not limited to: • Arm/Hand guard, gloves • Eye protection (goggles, shield) • Hearing protection (ear muffs, ear plugs) • Hair Net/cap/bonnet • Hard hat • Face protection (mask, shield) • Apron/Gown/coverall/jump suit • Anti-static suits • High-visibility reflective vest 3. Incidents and emergencies may include but are not limited to: • Chemical spills • Equipment/vehicle accidents • Explosion • Fire • Gas leak • Injury to personnel • Structural collapse • Toxic and/or flammable vapors emission. 4. OSH requirements / regulations may include but are not limited to: • Building code • Permit to Operate 5. OSH-related trainings may include but are not limited to: • Safety Orientations relevant to tasks • Safe and Correct Operation of Tools and Equipment • Health Orientations/trainings • Prevention and Control of OSH Hazards in the workplace • Chemical Handling • Safety Trainings • Prevention and Control of Work-related Injuries and Illness • Basic First-aid Trainings • Emergency Response Trainings • Trainings on use of fire-extinguisher REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit of competency. Required Skills The individual needs to demonstrate the following skills: • Communication • Knowledge management • Collaborating • Interpersonal • Troubleshooting • Critical thinking • Observation ©TVET CDACC 2018 28 Required Knowledge The individual needs to demonstrate knowledge of: • General OSH principles and legislations • Principles of good housekeeping (5S) • Company/workplace policies/ guidelines • Standards and safety requirements of work process and procedures • Standard Workplace emergency plan and procedures • Safety and health requirements of tasks • Workplace guidelines on providing feedback on OSH and security concerns • OSH regulations • Hazard control procedures • OSH trainings relevant to work EVIDENCE GUIDE This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range. 1. Critical Aspects of Competency 1.1.Assessment requires evidence that the candidate: 1.2.Arranged work area and items in accordance with 1.3.workplace procedures requirements 1.4.Followed work standards and procedures based on instructions 1.5.Applied Prevention and control measures based on instructions 1.6.Undertook orientations on OSH requirements and regulations in line with policy. 1.7.Provided feedback on occupational health and safety as per workplace instructions. 1.8.Adhered to workplace procedures for reporting hazards, incidents, injuries and sickness to as per workplace policy. 1.9.Identified and proposed OSH-related training needs as per workplace policy. 2. Resource Implications The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place 3. Methods of Assessment Competency in this unit may be assessed through: 3.1

Oral questioning 3.2 Portfolio of evidence 3.3 Third Party Reports 3.4 Written tests©TVET
CDACC 2018 29 4. Context of Assessment Competency may be assessed 4.1 On-the-job 4.2 Off-
the –job 4.3 During Industrial attachment 5. Guidance information for assessment Holistic
assessment with other units relevant to the industry sector, workplace and job role is
recommended.

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COMMON COMPETENCIES

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APPLY WORKPLACE HEALTH AND SAFETY

UNIT CODE: ENG/OS/WEF/CC/01/4/A

UNIT DESCRIPTION

This unit of competency is designed to equip individuals with skills for paid employment or self-employment in a variety of contexts. It specifies the competencies required in applying workplace safety practices, performing firefighting techniques, performing first aid practices, applying emergency site procedures and applying workplace environmental safety.

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. <i>Bold and italicized terms are elaborated in the Range</i>
1. Apply safety practices	1.1 Factors affecting health and safety in the workplace are identified 1.2 General work site and employer safety rules are applied 1.3 <i>Personal protective equipment (PPE)</i> used as per job requirements 1.4 Safety practice checklist is completed
2. Perform fire-fighting techniques	2.1 <i>Fires</i> are classified as per the fire classification chart 2.2 <i>Fire-fighting equipment</i> selected according to the fire classification chart 2.3 Use of fire-fighting equipment demonstrated as per PASS method 2.4 Fire-fighting checklist is completed
3. Perform first aid practices	3.1 Injury and/or medical emergency situation is determined 3.2 First aid procedures are applied 3.3 Incident and/or accident checklist is completed
4. Apply emergency site procedures	4.1 Site emergency plan is interpreted as standard operating procedures. 4.2 Instructions are followed and/or communicated as per workplace guideline. 4.3 Risk-assessment checklist is completed as per workplace guidelines. 4.4 Emergency preparedness and response plan applied

5. Apply workplace environmental safety	5.1 General workshop environmental hazards identified. 5.2 Workshop <i>hazardous materials/substances</i> are managed as per workplace procedures. 5.3 Worksite damage control techniques are applied 5.4 Housekeeping procedures are applied in accordance with environmental control and worksite requirements
6. Demonstrate OSH 2007 Act application	6.1 Interpret Occupational safety and health act of Kenya, 2007. 6.2 Prepare workplace safety checklist as per OSHA, 2007. 6.3 Apply prepared workplace safety checklist.

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.

Variables	Range
1. Personal Protective Equipment (PPE) may include but not limited to:	<ul style="list-style-type: none"> ● Safety boots ● Hard hat ● High visibility vest ● Hearing protection ● Fall protection ● Gloves ● Goggles
2. Fires	<ul style="list-style-type: none"> ● A ● B ● C ● D ● K
3. Firefighting equipment may include but not limited to:	<ul style="list-style-type: none"> ● Fire extinguishers ● Fire hoses ● Hose reels ● Fire blankets. ● Sand baskets. ● Fire hydrant. ●
4. Situation	<ul style="list-style-type: none"> ● Inaccessible places ● Places of extreme temperature ● High risk areas.

5. Hazardous materials/substances	Includes but not limited to; <ul style="list-style-type: none"> ● Trailing wires and cables. ● Chemical substances in unmarked containers. ● Chemical splashes.
6. Firefighting report may include but not limited to:	<ul style="list-style-type: none"> ● Location and time of fire ● People involved ● Accident details ● Safety precautions that were/were not in place ● Machinery or substances involved ● Responses of emergency services.
7. Medical emergencies may include but not limited to:	<ul style="list-style-type: none"> ● Stopped heart and breathing (CPR) ● Stopping bleeding ● Splinting and binding fractures ● Covering and calming, and dealing with epileptic fits ● Hyper ventilation ● Hypo/hyperthermia ● Chemical and fire burns ● Respiratory problems or suffocation ● Electrical and any other shock
8. Accident report may include but not limited to:	<ul style="list-style-type: none"> ● Location and time of injury/<i>medical emergency</i> ● People involved ● Accident details ● Safety precautions that were/were not in place ● Machinery or substances involved ● Responses of emergency services
9. Information may include but not limited to:	<ul style="list-style-type: none"> ● Exit routes. ● Evacuation routes ● Procedures ● Contact protocol.

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Communication
- Team Work
- Problem solving
- Planning and Organizing
- Self-management
- Technology
- Work safety
- Preparing materials
- Proper handling of tools and equipment

Required Knowledge

The individual needs to demonstrate knowledge of:

- Company policies and procedures, including site emergency plans
- Manufacturers' specifications
- Legislative requirements
- Risks and consequences of HIV and AIDS, STDs and STIs to self and others
- Personal Protective Clothing and Equipment
- Causes and classes of fire
- Range of firefighting equipment.
- Firefighting procedures.
- Basic first aid procedures and techniques
- Gender parity issues, non-discrimination of women including raping
- Environmental awareness, protection and enhancement

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: 1.1 Factors affecting health and safety in the workplace are identified 1.2 General work site and employer safety rules are applied 1.3 Safety practice checklist is completed 1.4 Fire-fighting equipment selected according to the fire classification chart.
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	<p>1.5 Use of fire-fighting equipment demonstrated as per PASS method.</p> <p>1.6 Fire-fighting checklist is completed.</p> <p>1.7 First aid procedures are applied.</p> <p>1.8 Site emergency plan is interpreted as standard operating procedures.</p> <p>1.9 Instructions are followed and/or communicated as per workplace guideline.</p> <p>1.10 Emergency preparedness and response plan applied.</p> <p>1.11 Workshop hazardous materials/substances are managed as per workplace procedures.</p> <p>1.12 Worksite damage control techniques are applied.</p> <p>1.13 Housekeeping procedures are applied in accordance with environmental control and worksite requirements</p>
2. Resource implications	<p>The following resources must be provided:</p> <p>2.1 Equipped welding work place</p> <p>2.2 Tools, equipment and accessories for arc welding works</p> <p>2.3 Materials relevant to the task</p> <p>2.4 Manufacturer’s specifications and manuals for the machines used for the job.</p>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4. Context of Assessment	<p>4.1 On-the-job</p> <p>4.2 Off-the –job</p> <p>4.3 During Industrial attachment</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

APPLY WORKPLACE ESSENTIAL SKILLS

UNIT CODE: ENG/OS/WEF/CC/02/4/A

UNIT DESCRIPTION:

This unit of competency has been designed for people who wish to enter paid employment or self-employment in a variety of contexts. It specifies the competencies required in following principles of work ethics, resolving conflict with others, demonstrating effective speaking and listening skills, reading and interpreting work document, interacting with team members and performing individual role in a team.

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. (<i>Bold and italicized terms are elaborated in the Range</i>)
1. Follow principles of work ethics	1.1 <i>Work ethics</i> and expectations are identified. 1.2 Time management skills demonstrated 1.3 Conflict management skills demonstrated. 1.4 Company policies and procedures are observed 1.5 Self-assessment from time to time is carried out.
2. Resolve conflict with others	2.1 <i>Problems</i> at the work site are identified and analysed 2.2 Company policies and procedures for solving problems are applied 2.3 Problems and disagreements resolution are justified with applicable legislation 2.4 Conflict resolution techniques are followed. 2.5 Effectiveness of problem or conflict resolution is evaluated
3. Demonstrate effective speaking and listening skills	3.1 Appropriate means of oral communication is selected. 3.2 Oral message is communicated correctly. 3.3 Clear and accurate oral message is conveyed 3.4 Feedback on the message conveyed is obtained and interpreted. 3.5 Corrective message communication measures are applied.

4. Read and interpret work document	<p>4.1 Required work document are gathered and interpreted</p> <p>4.2 Work document details are verified against actual work</p> <p>4.3 Work document to correspond to actual work are reviewed</p>
5. Interact with team members	<p>5.1 Correct team members are identified according to task requirements</p> <p>5.2 Capabilities of each team member are determined according to task requirements</p> <p>5.3 Acceptable, non-offensive language and gestures are used</p> <p>5.4 Relationships between members are maintained</p> <p>5.5 Suitable corrective measures for deviating members are employed</p> <p>5.6 Cross cultural diversities are accommodated</p>
6. Perform individual role in a team	<p>6.1 Individual roles in a team are identified.</p> <p>6.2 Assigned roles to the individual are performed</p>

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. Work ethics include but not limited to:	<ul style="list-style-type: none"> ● Honesty ● Selflessness ● Consistency ● Moral ● Courage ● Respect. ● Cooperation. ● Teamwork. ● Communication.
2. Problems include but not limited to:	<ul style="list-style-type: none"> ● Interpersonal problems ● Organisational problems ● Group problems

	<ul style="list-style-type: none"> ● Inter organizational problems
3. Work documents include but not limited to:	<ul style="list-style-type: none"> ● Work timesheets ● Attendance registers ● Job cards site maps ● Plans ● Inspection licenses ● Authority approvals documents ● Equipment inspection checks sheets ● Safe systems of work documents.

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Communication
- Team Work
- Problem solving
- Planning and Organising
- Self-management
- Technology

Required knowledge

The individual needs to demonstrate knowledge of:

- Concept of a team and team work
- Multi-cultural diversity
- Team goals and motivation
- Problem/conflict solving techniques

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Work ethics and expectations are identified. 1.2 Conflicts are avoided. 1.3 Problems at the work site are identified and analysed 1.4 Followed principles of work ethics. 1.5 Conflict resolution techniques are followed. 1.6 Oral message is communicated correctly. 1.7 Feedback on the message conveyed is obtained and interpreted. 1.8 Required work document are gathered and interpreted 1.9 Relationships between members are maintained. 1.10 Assigned roles to the individual are performed
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant or appropriate environment where assessment can take place. 2.2 Materials relevant to the proposed activity or tasks. 2.3 Audio and videos on demonstration of interpersonal relationship
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report
4. Context of Assessment	4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment

APPLY WORKSHOP CONCEPTS, TOOLS AND ORGANIZATION SKILLS

UNIT CODE: ENG/OS/WEF/CC/03/4/A

UNIT DESCRIPTION

This unit of competency specifies the skills required for a worker in application of workshop tools, welding drawings, basic welding measurements and mensuration. It also includes competencies: Applying workshop tools and equipment, performing basic measurements and calculations, interpreting drawings and specifications, applying time management techniques, quality improvement measures and productivity improvement measures.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA <i>(Bold and italicised terms are elaborated in the Range)</i>
1. Apply workshop tools and equipment	1.1 Workshop tools used in welding practice are identified. 1.2 Workshop tools inspected as per standard operating procedures. 1.3 Workshop tools used as per manufacturer's specifications 1.4 Shop tools maintained as per workplace procedures and best practices.
2. Perform basic measurements and calculations	2.1 Classification of measuring tools and instruments. 2.2 S.I units of measurements interpreted. 2.3 Conversion of measurements. 2.4 Linear and angular measurements are performed. 2.5 Mensuration is performed.
3. Interpret drawings and specifications	3.1 Drawing instruments and materials are identified. 3.2 Scales, symbols and types of drawings are produced. 3.3 Material requirements and specifications are extracted from the drawings. 3.4 Parts sketches are produced. 3.5 Drawings are cared for and stored.
4. Apply time management techniques	4.1 Work schedule is identified. 4.2 Tasks completion time is observed 4.3 Tasks completion checklist is completed.
5. Apply work improvement measures	5.1 Tasks requirements observed. 5.2 Tasks correctional measures are applied. 5.3 Work quality checklist is completed.

6. Apply productivity improvement measures	6.1 Production objectives identified. 6.2 Production rate is interpreted 6.3 Production <i>improvement interventions</i> applied.
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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. Tasks include but not limited to:	<ul style="list-style-type: none"> ● Door making ● Window making ● Metallic roofing ● Steel gate making
2. Correctional measures include but not limited to;	<ul style="list-style-type: none"> ● Grinding ● Filing ● Re-welding ● Heat treatment ● Pressing ● Filling
3. Improvement interventions include but not limited to;	<ul style="list-style-type: none"> ● Filling ● Pressing ● Re-welding ● Painting

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

The individual needs to demonstrate the following skills:

- Communication
- Team Work
- Problem solving

- Planning and Organizing
- Self-management
- Technology

Required knowledge

The individual needs to demonstrate knowledge of:

- Basic mathematics
- Calculator basics
- Quality requirements
- Time management concepts
- Team goals and motivation

EVIDENCE GUIDE

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

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Workshop tools inspected as per standard operating procedures. 1.2 Workshop tools used as per manufacturer's specifications 1.3 Shop tools maintained as per workplace procedures and best practices 1.4 Linear and angular measurements are performed. 1.5 Mensuration is performed 1.6 Material requirements and specifications are extracted from the drawings. 1.7 Parts sketches are produced. 1.8 Drawings are cared for and stored. 1.9 Tasks completion time is observed 1.10 Tasks completion checklist is completed 1.11 Tasks requirements observed. 1.12 Tasks correctional measures are applied. 1.13 Work quality checklist is completed 1.14 Production objectives identified. 1.15 Production improvement interventions applied
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<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Equipped workplace or simulated work area 2.2 Measuring equipment and instruments 2.3 Materials relevant to the tasks 2.4 Sample Job cards 2.5 Sample work schedules 2.6 Sample Work completion checklists 2.7 Sample quality checklist 2.8 Videos on tasks execution/ production
<p>3. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report
<p>4. Context of assessment</p>	<ul style="list-style-type: none"> 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment
<p>5. Guidance information for assessment</p>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

CORE COMPETENCIES

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PERFORM MANUAL METAL ARC WELDING

UNIT CODE: ENG/OS/WEF/CR/01/4/A

UNIT DESCRIPTION

This unit of competency specifies skills required in carrying out manual metal arc welding operations in all positions. These include competencies in setting up and carrying out welding tasks while observing welding safety. This unit is also known as Shielded Metal Arc Welding (SMAW).

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. <i>Bold and italicized terms are elaborated in the Range</i>
1. Apply safety to a workplace	1.1. <i>Personal Protective Equipment</i> (PPE) for the job is selected. 1.2. PPE worn as per job requirements 1.3. Permits and approvals required for welding works are confirmed as per standard operating procedures. 1.4. Incidents, hazards and risks are identified
2. Apply housekeeping to welding work area	2.1 Housekeeping before, during and after welding is performed. 2.2 Tools, equipment and unused materials and consumables are cleaned and/or returned to safe area 2.3 Completed work piece is stored/ handed as per work place procedures.
3. Take-in Instructions	3.1. Welding instructions are interpreted as per supervisor/mentor guidelines. 3.2. Drawings and specifications are interpreted according to standard operating procedures. 3.3. Executed supervisor/mentor's instructions.
4. Prepare materials, tool and equipment	4.1 Consumables, materials, tools and equipment for the specific job are obtained. 4.2 Work pieces are measured, marked, cut and prepared according to specifications. 4.3 Equipment is set up according to manufacturer's specification 4.4 Equipment setting up checklist completed.
5. Arc weld work pieces	5.1 Workpieces are set up as per the supervisor/ mentor's instructions/ job card requirements.

	<p>5.2 Positional arc welding is conducted according to supervisor/mentor's instructions.</p> <p>5.3 Weld is completed as per acceptance criteria and job requirements</p> <p>5.4 Welding safety is observed.</p> <p>5.5 Accidents- and incidents-checklist completed according to workplace procedure.</p>
6. Repair welds	<p>6.1 Weld is dressed as required by the specification</p> <p>6.2 Weld is repaired as per job requirements/acceptance criteria.</p> <p>6.3 Discontinuities/ defects are identified according to acceptance criteria</p>

RANGE

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

Variable	Range
1. Personal Protective Equipment (PPE) may include but not limited to;	<ul style="list-style-type: none"> ● Fire retardant overall/leather apron ● Welding gloves ● Welding shields ● Safety boots ● Ear safety devices ● Head protection devices
2. Positional weld may include but not limited to;	<ul style="list-style-type: none"> ● Flat butt (1G) and fillet (1F) ● Horizontal butt (2G) and fillet (2F) ● Vertical fillet (3F) and butt (3G) ● Overhead fillet (4F) and butt (4G) ● Additional positions in pipe butt – 5G and 6G.
3. Dressed may include but not limited to;	<ul style="list-style-type: none"> ● Remove slag ● Grind

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:

- Use of PPEs
- Communication
- Team Work
- Planning
- Self-management

Required Knowledge

The individual needs to demonstrate knowledge of:

- Safety rules and regulations applicable to the job
- Types of PPE
- Weld positions; flat butt, horizontal butt, vertical and overhead
- Use shop tools, equipment and materials
- Uses of metals in order to be able to select the correct metal
- Uses of different electrode rods
- Amperage and its influence on the selection of rod and materials used
- Housekeeping procedures
- Safety rules and regulations applicable to the job
- Interpret welding symbols and specifications

EVIDENCE GUIDE

<p>1. This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Personal Protective Equipment (PPE) for the job is selected. 1.2 PPE worn as per job requirements 1.3 Permits and approvals required for welding works are confirmed as per standard operating procedures. 1.4 Incidents, hazards and risks are identified Housekeeping before, during and after welding is performed. 1.5 Welding instructions are interpreted as per supervisor/mentor guidelines. 1.6 Drawings and specifications are interpreted according to standard operating procedures. 1.7 Executed supervisor/mentor's instructions. 1.8 Work pieces are measured, marked, cut and prepared according to specifications. 1.9 Equipment setting up checklist complete 1.10 Workpieces are set up as per the supervisor/ mentor's instructions/ job card requirements. 1.11 Positional arc welding is conducted according to supervisor/ mentor's instructions. 1.12 Welding safety is observed. 1.13 Accidents- and incidents-checklist completed according to workplace procedure 1.14 Weld is completed as per acceptance criteria and job requirements 1.15 Weld is repaired as per job requirements/acceptance criteria 1.16 Discontinuities/ defects are identified according to acceptance criteria
<p>2. Resource implications</p>	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 2.1 Equipped welding work place 2.2 Tools, equipment and accessories for welding works 2.3 Materials relevant to the task 2.4 Manufacturer's specifications and manuals relevant to the task
<p>3. Methods of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation

	<p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4. Context for assessment	<p>4.1 On-the-job</p> <p>4.2 Off-the –job</p> <p>4.3 During Industrial attachment</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

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PERFORM GAS METAL ARC WELDING

UNIT CODE: ENG/OS/WEF/CR/02/4/A

UNIT DESCRIPTION

This unit of competency specifies skills required to prepare welding work, set up and carry out gas metal arc welding (GMAW) while observing safety. GMAW is known as metal inert gas (MIG) when an inert gas is used for shielding. It also known as metal active gas (MAG) when an active gas is used for shielding.

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. <i>Bold and italicized terms are elaborated in the Range</i>
1. Apply safety to a workplace	1.1. <i>Personal Protective Equipment (PPE)</i> for the job are selected. 1.2. Wore PPE as per job requirements 1.3. Permits and approvals confirmed prior to starting work 1.4. Incidents, hazards and risks are identified.
2. Apply housekeeping to welding work area	2.1 Housekeeping before, during and after welding is performed. 2.2 Tools, equipment and unused materials and consumables are cleaned and/or returned to safe area. 2.3 Completed work piece is stored/ handed over as per work place procedures.
3. Take-in Instructions	3.1 Interpreted welding instructions as per supervisor/mentor guidelines. 3.2 Drawings and specifications are interpreted according to standard operating procedures. 3.3 Executed supervisor/mentor's instructions.
4. Prepare materials, tool and equipment	4.1 <i>Consumables</i> , materials, tools and equipment for the specific job are obtained. 4.5 <i>Work pieces</i> are measured, marked, cut and prepared according to specifications. 4.6 MIG/MAG Equipment is set up according to manufacturer's specification

	4.7 MIG/MAG Equipment setting up checklist completed.
5. Weld work pieces	<p>5.1 Set up weld workpiece as per the supervisor/ mentor's instructions/ job card requirements.</p> <p>5.2 Conducted <i>positional</i> arc welding according to supervisor/ mentor's instructions.</p> <p>5.3 Weld is completed as per acceptance criteria and job requirements</p> <p>5.4 Adhered to applicable arc welding safety.</p> <p>5.5 Accidents- and incidents-checklist completed according to workplace procedure.</p>
6. Repair welds	<p>6.1 Weld is completed as per job requirements</p> <p>6.2 Weld <i>repaired</i> as per job requirements</p> <p>6.3 Discontinuities/ defects identified according to acceptance criteria.</p>

RANGE

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

Variable	Range
1. Personal Protective Equipment (PPE) may include but not limited to/limited to;	<ul style="list-style-type: none"> ● Fire retardant overall/leather apron ● Welding gloves ● Welding shields ● Safety boots ● Ear safety devices ● Head protection devices
2. Consumables may include but not limited to/limited to;	<ul style="list-style-type: none"> ● Argon/ CO₂ gases ● Filler wire
3. Work pieces may include but not limited to/limited to;	<ul style="list-style-type: none"> ● Mild Steel ● Cast Iron ● Aluminium ● Alloy Steels ● Stainless Steel ● Carbon Steel
4. Position weld may include but not limited to/limited to;	<ul style="list-style-type: none"> ● Flat butt (1G) and fillet (1F) ● Horizontal butt (2G) and fillet (2F) ● Vertical fillet (3F) and butt (3G)

	<ul style="list-style-type: none">• Overhead fillet (4F) and butt (4G)• Pipe joint 5G and 6G
5. Repaired	<ul style="list-style-type: none">• Grinding and re-welding

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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:

- Use of PPEs
- Communication
- Team Work
- Planning
- Self-management

Required Knowledge

The individual needs to demonstrate knowledge of:

- Types of PPE
- Use shop tools, equipment and materials
- Uses of different sizes of filler wires
- Amperage and its influence on the selection of filler wire
- Housekeeping procedures
- Safety rules and regulations applicable to the job

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: 1.1 Personal Protective Equipment (PPE) for the job is selected. 1.2 PPE worn as per job requirements 1.3 Permits and approvals required for welding works are confirmed as per standard operating procedures. 1.4 Incidents, hazards and risks are identified Housekeeping before, during and after welding is performed. 1.5 Welding instructions are interpreted as per supervisor/mentor guidelines. 1.6 Drawings and specifications are interpreted according to standard operating procedures. 1.7 Executed supervisor/mentor's instructions. 1.8 Work pieces are measured, marked, cut and prepared according to specifications. 1.9 MIG/MAG Equipment setting up checklist complete
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	<p>1.10 Workpieces are set up as per the supervisor/ mentor's instructions/ job card requirements.</p> <p>1.11 Positional arc welding is conducted according to supervisor/ mentor's instructions.</p> <p>1.12 Welding safety is observed.</p> <p>1.13 Accidents- and incidents-checklist completed according to workplace procedure</p> <p>1.14 Weld is completed as per acceptance criteria and job requirements</p> <p>1.15 Weld is repaired as per job requirements/acceptance criteria</p> <p>1.16 Discontinuities/ defects are identified according to acceptance criteria</p>
2. Resource implications	<p>The following resources must be provided:</p> <p>2.1 Equipped welding work place</p> <p>2.2 Tools, equipment and accessories for arc welding works</p> <p>2.3 Materials relevant to the task</p> <p>2.4 Manufacturer's specifications and manuals relevant to the task</p>
3. Methods of assessment	<p>Competency may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4. Context for assessment	<p>4.1 On-the-job</p> <p>4.2 Off-the -job</p> <p>4.3 During Industrial attachment</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>