THE REPUBLIC OF KENYA

TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

NATIONAL OCCUPATIONAL STANDARDS

FOR

TEXTILE PROCESSING CRAFT PERSON

LEVEL 5

TVET CDACC
P.O BOX 15745-00100
NAIROBI

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FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya's development blueprint, Vision 2030 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 of Kenya 2010 and this resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). 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 developing a competency-based curriculum for Textile Processing Level 5. These Occupational Standards will also be the bases 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 Textile sector's growth and 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 Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET in order to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labor force.

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with Textile Engineering Sector Skills Advisory Committee (SSAC) have developed these Occupational Standards for Textile technician. These standards will be the bases for development of competency-based curriculum for Textile Processing Level 5.

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, Textile SSAC, expert workers and all those who participated in the development of these Occupational Standards.

CHAIRPERSON,
TVET CDACC

ACKNOWLEDGMENT

These Occupational Standards were developed through combined effort of various stakeholders from private and public organizations. I am 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 Textile 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 participation of these Standards.

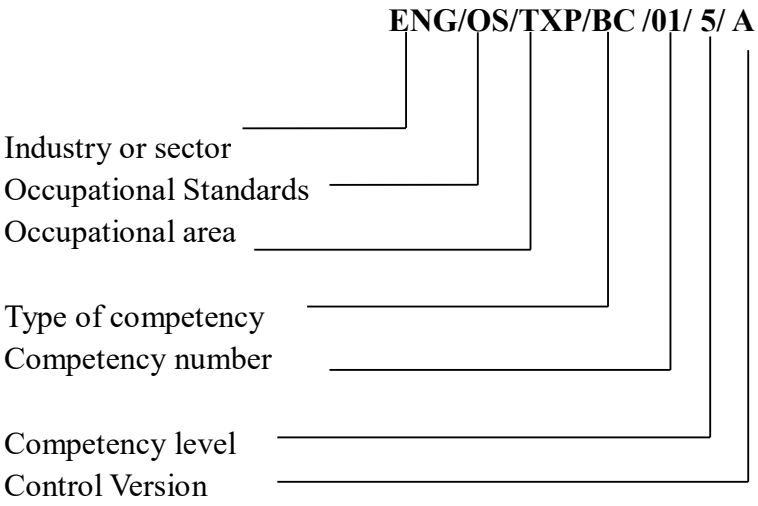
I acknowledge all other institutions that in one way or another contributed to the development of these Occupational Standards.

CHAIRPERSON,
TEXTILE ENGINEERING
SECTOR SKILLS ADVISORY COMMITTEE

ABBREVIATION AND ACRONYMS

BC	Basic Competency
CC	Common Competency
CDACC	Curriculum Development, Assessment and Certification Council
CR	Core Competency
ENG	Engineering
ICT	Information and Communication Technology
IT	Information Technology
OS	Occupational Standards
OSHA	Occupational Safety and Health Act
PPE	Personal protective equipment
SOP	Standard Operating Procedures
TVET	Technical and Vocational Education and Training
TXP	Textile Processing

KEY TO UNIT CODE



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OVERVIEW

Textile Processing Craft Person Level 5 qualification consists of competencies that a person must achieve to enable him/her to work in a Textile Processing plant.

The units of competency comprising the Textile Processing craft person level 5 qualifications include the following basic and core competencies:

BASIC UNITS OF COMPETENCY	
Unit of competency Code	**Units of competency**
ENG/OS/TXP/BC /01/ 5/A	Demonstrate communication skills
ENG/OS/TXP/BC /02/ 5/A	Demonstrate digital literacy
ENG/OS/TXP/BC /03/ 5/A	Demonstrate entrepreneurial skills
ENG/OS/TXP/BC /04/ 5/A	Demonstrate employability skills
ENG/OS/TXP/BC /05/ 5/A	Demonstrate environmental literacy
ENG/OS/TXP/BC /06/ 5/A	Demonstrate occupational health and safety
COMMON UNITS OF COMPETENCY	
ENG/OS/TXP/CC/01/5/A	Prepare and interpret technical drawings
ENG/OS/TXP/CC/02/5/A	Apply engineering mathematics
ENG/OS/TXP/CC/03/5/A	Apply mechanical science principles
ENG/OS/TXP/CC/04/5/A	Apply fluid mechanics principles
ENG/OS/TXP/CC/05/5/A	Apply material science
CORE UNITS OF COMPETENCY	
ENG/OS/TXP/CR/01/5/A	Produce pre-treated textiles
ENG/OS/TXP/CR/02/5/A	Produce dyed textiles
ENG/OS/TXP/CR/03/5/A	Produce printed textiles
ENG/OS/TXP/CR/04/5/A	Perform textile finishing
ENG/OS/TXP/CR/05/5/A	Perform quality control
ENG/OS/TXP/CR/06/5/A	Perform machine maintenance

BASIC UNITS OF COMPETENCY

DEMONSTRATE COMMUNICATION SKILLS

UNIT CODE: ENG/OS/TXP/BC/01/5/A

UNIT DESCRIPTION

This unit covers the competencies required to demonstrate communication skills. It involves meeting communication needs of clients and colleagues, contributing to the development of communication strategies, conducting workplace interviews, facilitating group discussions and representing the organization

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	1.1 Specific communication needs of clients and colleagues are identified and met based on workplace requirements 1.2 Different communication approaches are identified and applied according to clients' needs 1.3 Conflict is identified and addressed as per the standards of the organization
2. Contribute to the development of communication strategies	2.1 Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as per organizations' strategic plan 2.2 Channels of communication are established and reviewed based on the workplace needs 2.3 Communication training needs are identified and provided according to SOPs 2.4 Work related network and relationship are maintained based on workplace requirements 2.5 Negotiation and conflict resolution strategies are maintained as per the workplace procedures
3. Conduct workplace interviews	3.1 ***Communication strategies*** are identified and employed in ***interview situations*** based on workplace requirements

	3.2 Records of interviews are made and maintained in accordance with organizational procedures 3.3 Effective questioning, listening and nonverbal communication techniques are used based on needs
4. Facilitate group discussions	4.1 Mechanisms to enhance ***effective group interaction*** are identified and implemented according to workplace requirements 4.2 Strategies to encourage group participation are identified and used as per organizations' procedures 4.3 Meetings objectives and agenda are set and followed based on workplace requirements 4.4 Relevant information is provided and feedback obtained according to set protocols 4.5 Evaluation of group communication strategies is undertaken in accordance with workplace guidelines 4.6 Specific communication needs of individuals are identified and addressed as per individual needs
5. Represent the organization	5.1 Relevant presentation are researched and presented based on internal or external communication forums requirements Presentation is delivered in a clear and sequential manner as per the predetermined time 5.2 Presentation is made as per appropriate media 5.3 Difference views are respected based on workplace procedures 5.4 Written communication is done as per organizational standards 5.5 Inquiries are responded according to 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

1. Communication strategies may include but not limited to:	• Language switch • Comprehension check • Repetition • Asking confirmation • Paraphrase • Clarification request • Translation • Restructuring • Approximation • Generalization
2. Effective group interaction may include 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
3. Interview situations may 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:

- Active listening
- Giving/receiving feedback
- Interpretation of information
- Role boundaries setting
- Negotiation
- Communication

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

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 Met communication needs of clients and colleagues 1.2 Contributed to the development of communication strategies 1.3 Conducted interviews 1.4 Facilitated group discussions 1.5 Represented the organization
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
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	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 DIGITAL LITERACY

UNIT CODE: ENG/OS/TXP/BC/02/5/A

UNIT DESCRIPTION

This unit covers the competencies required to demonstrate digital literacy. It involves identifying appropriate computer software and hardware, applying security measures to data, hardware, and software in automated environment, applying computer software in solving tasks, applying internet and email in communication at workplace, applying desktop publishing in official assignment and preparing presentation packages.

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	1.1 Concepts of ICT are determined in accordance with computer equipment 1.2 Classifications of computers are determined in accordance with manufacturers specification 1.3 ***Appropriate computer software*** is identified according to manufacturer's specification 1.4 ***Appropriate computer hardware*** is identified according to manufacturer's specification 1.5 Functions and commands of operating system are determined in accordance with manufacturer's specification
2. Apply security measures to data, hardware, software in automated environment	2.1 ***Data security and privacy are classified*** in accordance with the prevailing technology 2.2 ***Security threats*** are identified, **and** ***control measures*** are applied in accordance with laws governing protection of ICT 2.3 Computer threats and crimes are detected in accordance with 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 ***Word processing concepts*** are applied in resolving workplace tasks, report writing and documentation as per job requirements 3.2 ***Word processing utilities*** are applied in accordance with workplace procedures 3.3 Worksheet layout is prepared in accordance with work procedures 3.4 Worksheet is build and data manipulated in the worksheet in accordance with workplace procedures 3.5 Continuous data manipulated on worksheet is undertaken in accordance with work requirements 3.6 Database design and manipulation is undertaken in accordance with office procedures 3.7 Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures
4. Apply internet and email in communication at workplace	4.1 Electronic mail addresses are opened and applied in workplace communication in accordance with office policy 4.2 Office internet functions are defined and executed in accordance with office procedures 4.3 ***Network configuration*** is determined in accordance with office operations procedures 4.4 Official World Wide Web is installed and managed according to workplace procedures
5. Apply desktop publishing in official assignments	5.1 Desktop publishing functions and tools are identified in accordance with manufactures specifications 5.2 Desktop publishing tools are developed in accordance with work requirements 5.3 Desktop publishing tools are applied in accordance with workplace requirements 5.4 Typeset work is enhanced in accordance with workplace standards
6. Prepare presentation packages	6.1 Types of presentation packages are identified in accordance with office requirements 6.2 Slides are created and formulated in accordance with workplace procedures 6.3 Slides are edited and run in accordance with work procedures

	6.4 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.

Variable	Range
1. Appropriate computer hardware may include but not limited to:	• Computer case • Monitor • keyboard • mouse
2. Data security and privacy may include but not limited to:	• Confidentiality of data • Cloud computing • Integrity -but-curious data surfing
3. Security and control measures may include but not limited to:	• Counter measures against cyber terrorism • Risk reduction • Cyber threat issues • Risk management • Pass wording
4. Security threats may include but not limited to:	• Cyber terrorism • Hacking

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
- 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
- Microsoft suite

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 and controlled security threats 1.2 Detected and protected computer crimes 1.3 Applied word processing in office tasks 1.4 Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures 1.5 Opened electronic mail for office communication as per workplace procedure 1.6 Installed internet and World Wide Web for office tasks in accordance with office procedures 1.7 Integrated emerging issues in computer ICT applications 1.8 Applied laws governing protection of ICT
2. Resource Implications	The following resources should be provided: 2.1 Tablets 2.2 Laptops 2.3 Desktop computers 2.4 Calculators 2.5 Internet 2.6 Smart phones 2.7 Operation Manuals
3. Methods of Assessment	Competency may be assessed through: 3.1 Written Test 3.2 Observation 3.3 Practical assignment

	3.4 Interview/Oral Questioning
4. Context of Assessment	Competency may be assessed in: 4.1 Off the job 4.2 On the job setting 4.3 Industrial attachment
5. 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 : ENG/OS/TXP/BC/03/5/A

UNIT DESCRIPTION

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship, and self-employment, identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation, developing business innovative strategies and developing business plan.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements that specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Demonstrate understanding of an Entrepreneur	1.1 Entrepreneurs and Businesspersons are distinguished as per principles of entrepreneurship 1.2 ***Types of entrepreneurs*** are identified as per principles of entrepreneurship 1.3 Ways of becoming an Entrepreneur are identified as per principles of Entrepreneurship 1.4 ***Characteristics of Entrepreneurs*** are identified as per principles of Entrepreneurship 1.5 Factors affecting Entrepreneurship development are explored as per principles of Entrepreneurship
2. Demonstrate understanding of Entrepreneurship and self-employment	2.1 Entrepreneurship and self-employment are distinguished as per principles of entrepreneurship 2.2 Importance of self-employment is analysed based on business procedures and strategies 2.3 ***Requirements for entry into self-employment*** are identified according to business procedures and strategies

	2.4 Role of an Entrepreneur in business is determined according to business procedures and strategies 2.5 Contributions of Entrepreneurs to National development are identified as per business procedures and strategies 2.6 Entrepreneurship culture in Kenya is explored as per business procedures and strategies 2.7 Born or made Entrepreneurs are distinguished as per entrepreneurial traits
3. Identify Entrepreneurship opportunities	3.1 Sources of business ideas are identified as per business procedures and strategies 3.2 Business ideas and opportunities are generated as per business procedures and strategies 3.3 Business life cycle is analysed as per business procedures and strategies 3.4 Legal aspects of business are identified as per procedures and strategies 3.5 Product demand is assessed as per market strategies 3.6 Types of ***business environment*** are identified and evaluated as per business procedures 3.7 Factors to consider when evaluating business environment are explored based on business procedure and strategies 3.8 Technology in business is incorporated as per best practice
4. Create entrepreneurial awareness	4.1 ***Forms of businesses*** are explored as per business procedures and strategies 4.2 Sources of business finance are identified as per business procedures and strategies 4.3 Factors in selecting source of business finance are identified as per business procedures and strategies 4.4 ***Governing policies*** on Small Scale Enterprises (SSEs) are determined as per business procedures and strategies

	4.5 Problems of starting and operating SSEs are explored as per business procedures and strategies
5. Apply entrepreneurial motivation	5.1 ***Internal and external motivation*** factors are determined in accordance with motivational theories 5.2 Self-assessment is carried out as per entrepreneurial orientation 5.3 Effective communications are carried out in accordance with communication principles 5.4 Entrepreneurial motivation is applied as per motivational theories
6. Develop innovative business strategies	6.1 Business innovation strategies are determined in accordance with the organization strategies 6.2 Creativity in business development is demonstrated in accordance with business strategies 6.3 ***Innovative business strategies*** are developed as per business principles 6.4 Linkages with other entrepreneurs are created as per best practice 6.5 ICT is incorporated in business growth and development as per best practice
7. Develop Business Plan	7.1 Identified Business is described as per business procedures and strategies 7.2 Marketing plan is developed as per business plan format 7.3 Organizational/Management plan is prepared in accordance with business plan format 7.4 Production/operation plan in accordance with business plan format 7.5 Financial plan is prepared in accordance with the business plan format 7.6 Executive summary is prepared in accordance with business plan format 7.7 Business plan is presented as per best practice

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. Types of entrepreneurs may include but not limited to:	• Innovators • Imitators • Craft • Opportunistic • Speculators
2. Characteristics of Entrepreneurs may include but not limited to:	• Creative • Innovative • Planner • Risk taker • Networker • Confident • Flexible • Persistent • Patient • Independent • Future oriented • Goal oriented
3. Requirements for entry into self-employment may include but not limited to	• Technical skills • Management skills • Entrepreneurial skills • Resources • Infrastructure
4. Internal and external motivation may include but not limited to:	• Interest • Passion • Freedom • Prestige • Rewards • Punishment • Enabling environment • Government policies
5. Business environment may include but not limited to:	• External • Internal • Intermediate
6. Forms of businesses may include but not limited to:	• Sole proprietorship

	• Partnership • Limited companies • Cooperatives
7. Governing policies may include but not limited to:	• Increasing scope for finance • Promoting cooperation between entrepreneurs and private sector • Reducing regulatory burden on entrepreneurs • Developing IT tools for entrepreneurs
8. Innovative business strategies may include but not limited to:	• New products • New methods of production • New markets • New sources of supplies • Change in industrialization

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
- Management
- Problem-solving
- Root-cause analysis
- Communication

Required Knowledge

The individual needs to demonstrate knowledge of:

- Decision making
- Business communication
- Change management
- Competition
- Risk
- Net working
- Time management
- Leadership
- Factors affecting entrepreneurship development
- Principles of Entrepreneurship
- Features and benefits of common operational practices, e. g., continuous improvement (kaizen), waste elimination,

- Conflict resolution
- Health, safety and environment (HSE) principles and requirements
- Customer care strategies
- Basic financial management
- Business strategic planning
- Impact of change on individuals, groups and industries
- Government and regulatory processes
- Local and international market trends
- Product promotion strategies
- Market and feasibility studies
- Government and regulatory processes
- Local and international business environment
- Relevant developments in other industries
- Regional/ County business expansion 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: 1.1 Distinguished entrepreneurs and business persons correctly 1.2 Identified ways of becoming an entrepreneur appropriately 1.3 Explored factors affecting entrepreneurship development appropriately 1.4 Analysed importance of self-employment accurately 1.5 Identified requirements for entry into self-employment correctly 1.6 Identified sources of business ideas correctly 1.7 Generated Business ideas and opportunities correctly 1.8 Analysed business life cycle accurately 1.9 Identified legal aspects of business correctly 1.10 Assessed product demand accurately 1.11 Determined Internal and external motivation factors appropriately 1.12 Carried out communications effectively 1.13 Identified sources of business finance correctly

	1.14 Determined Governing policy on small scale enterprise appropriately 1.15 Explored problems of starting and operating SSEs effectively 1.16 Developed Marketing, Organizational/Management, Production/Operation and Financial plans correctly 1.17 Prepared executive summary correctly 1.18 Determined business innovative strategies appropriately 1.19 Presented business plan effectively
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 may be assessed through: 3.1 Written tests 3.2 Oral questions 3.3 Third party report 3.4 Interviews 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.

DEMONSTRATE EMPLOYABILITY SKILLS

UNIT CODE: ENG/OS/TXP/BC/04/5/A

UNIT DESCRIPTION

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 managing 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	1.1 Personal vision, mission and goals are formulated based on potential and in relation to organization objectives 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 interpersonal communication	2.1 Writing skills are demonstrated as per communication policy 2.2 Negotiation and persuasion skills are demonstrated as per communication policy

	2.3 Internal and external stakeholders' needs are identified and interpreted as per the communication policy 2.4 Communication networks are established based on workplace policy 2.5 Information is shared as per communication policy
3. Demonstrate critical safe work habits	3.1 Stress is managed in accordance with workplace policy. 3.2 Punctuality and time consciousness is demonstrated in line with workplace policy. 3.3 Personal objectives are integrated with organization goals based on organization's strategic plan. 3.4 ***Resources*** are utilized in accordance with workplace policy. 3.5 Work priorities are set in accordance to workplace goals and objectives. 3.6 Leisure time is recognized and utilized in line with personal objectives. 3.7 ***Drugs and substances of abuse*** are identified and avoided based on workplace policy. 3.8 HIV and AIDS prevention awareness is demonstrated in line with workplace policy. 3.9 Safety consciousness is demonstrated in the workplace based on organization safety policy. 3.10 ***Emerging issues*** are identified and dealt with in accordance with organization policy.
4. Lead small teams	4.1 Performance targets for the ***team*** are set based on organization's objectives 4.2 Duties are assigned in accordance with the organization policy. 4.3 ***Forms of communication*** in a team are established according to organization's policy. 4.4 Team performance is evaluated based on set targets as per workplace policy. 4.5 Conflicts are resolved between team members in line with organization policy. 4.6 Gender related issues are identified and mainstreamed in accordance workplace policy. 4.7 Human rights and fundamental freedoms are identified and respected as Constitution of Kenya 2010.

	4.8 Healthy relationships are developed and maintained in line with workplace.
5. Plan and organize work	5.1 Task requirements are identified as per the workplace objectives 5.2 Task is interpreted in accordance with safety (OHS), environmental requirements and quality requirements 5.3 Work activity is organized with other involved personnel as per the SOPs 5.4 Resources are mobilized, allocated and utilized to meet project goals and deliverables. 5.5 Work activities are monitored and evaluated in line with organization procedures. 5.6 Job planning is documented in accordance with workplace requirements. 5.7 Time is managed achieve workplace set goals and objectives.
6. Maintain professional growth and development	6.1 Personal training needs are identified and assessed in line with the requirements of the job. 6.2 ***Training and career opportunities*** are identified and utilized based on job requirements. 6.3 Resources for training are mobilized and allocated based organizations and individual skills needs. 6.4 Licensees and certifications relevant to job and career are obtained and renewed as per policy. 6.5 Work priorities and personal commitments are balanced and managed based on requirements of the job and personal objectives. 6.6 Recognitions are sought as proof of career advancement in line with professional requirements.
7. Demonstrate workplace learning	7.1 Learning opportunities are sought and managed based on job requirement and organization policy. 7.2 Improvement in performance is demonstrated based on courses attended. 7.3 Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job 7.4 Time and effort is invested in learning new skills based on job requirements 7.5 Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy.

	7.6 New systems are developed and maintained in accordance with the requirements of the job. 7.7 Awareness of personal role in workplace ***innovation*** is demonstrated based on requirements of the job.
8. Demonstrate problem solving skills	8.1 Creative, innovative and practical solutions are developed based on the problem 8.2 Independence and initiative in identifying and solving problems is demonstrated based on requirements of the job. 8.3 Team problems are solved as per the workplace guidelines 8.4 Problem solving strategies are applied as per the workplace guidelines 8.5 Problems are analysed and assumptions tested as per the context of data and circumstances
9. Demonstrate workplace ethics	9.1 Policies and guidelines are observed as per the workplace requirements 9.2 Self-worth and professionalism is exercised in line with personal goals and organizational policies 9.3 Code of conduct is observed as per the workplace requirements 9.4 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. Drug and substance abuse may include but not limited to:	Commonly abused • Alcohol • Tobacco • Miraa • Over-the-counter drugs • Cocaine • Bhang • Glue
2. Feedback may include but not limited to:	• Verbal • Written • Informal

	• Formal
3. Relationships may include but not limited to:	• Man/Woman • Trainer/trainee • Employee/employer • Client/service provider • Husband/wife • Boy/girl • Parent/child • Sibling relationships
4. Forms of communication may include but not limited to:	• Written • Visual • Verbal • Non verbal • Formal and informal
5. Team may include but not limited to:	• Small work group • Staff in a section/department • Inter-agency group
6. Personal growth may include 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
7. Personal objectives may include but not limited to:	• Long term • Short term • Broad • Specific
8. Trainings and career opportunities may include but not limited to	• Participation in training programs • Technical • Supervisory • Managerial • Continuing Education • Serving as Resource Persons in conferences and workshops
9. Resource may include but not limited to:	• Human • Financial • Hardware • Software

10. Innovation may include but not limited to:	• New ideas • Original ideas • Different ideas • Methods/procedures • Processes • New tools
11. Emerging issues may include but not limited to:	• Terrorism • Social media • National cohesion • Open offices
12. Range of media for learning may 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:

- Communication
- Critical thinking
- Observation
- Organizing
- Negotiation
- Monitoring
- Evaluation
- Record keeping
- Problem solving
- Decision Making
- Resource utilization
- Resource mobilization

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
- Gender mainstreaming
- HIV and AIDS
- Drug and substance abuse
- Leadership
- Safe work habits
- Professional growth and development
- Technology in the workplace
- Emerging issues
- Social media
- Terrorism
- National cohesion

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Conducted self-management 1.2 Demonstrated interpersonal communication 1.3 Demonstrated critical safe work habits 1.4 Led small teams 1.5 Planned and organized work 1.6 Maintained professional growth and development 1.7 Demonstrated workplace learning 1.8 Demonstrated problem solving skills 1.9 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.

DEMONSTRATE ENVIRONMENTAL LITERACY

UNIT CODE: ENG/OS/TXP/BC/05/5/A

UNIT DESCRIPTION

This unit describes the competencies required to demonstrate understanding of environmental literacy. It involves controlling environmental hazard, controlling control environmental pollution, complying with workplace sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs and monitoring activities on environmental protection/programs.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes that make up workplace function.	**PERFORMANCE CRITERIA** These assessable statements 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 strictly followed according to environmental regulations and OSHS. 1.2 ***Disposal methods*** of hazardous wastes are followed always according to environmental regulations and OSHS. 1.3 ***PPE*** is used according to OSHS.
2. Control environmental Pollution control	2.1 Environmental pollution ***control measures*** are compiled following standard protocol. 2.2 Procedures for solid waste management are observed according to Environmental Management and Coordination Act 1999 2.3 Methods for minimizing ***noise pollution*** is complied with based on Noise and Excessive Vibration *Pollution and Control Regulations*, 2009
3. Demonstrate sustainable resource use	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 and reducing resource consumption are practiced as per the Environmental Management and Coordination Act 1999

4.	Evaluate current practices in relation to resource usage	4.1 Information on resource efficiency ***systems and procedures*** are collected and provided to the work group where appropriate. 4.2 Current resource usage is measured and recorded by members of the work group. 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
6.	Implement specific environmental programs	6.1 Programs/Activities are identified according to organizations policies and guidelines. 6.2 Individual roles/responsibilities are determined and performed based on the activities identified. 6.3 Problems/constraints encountered are resolved in accordance with organizations' policies and guidelines 6.4 Stakeholders are consulted based on company guidelines
7.	Monitor activities on Environmental protection/Programs	7.1 Activities are periodically monitored and evaluated according to the objectives of the environmental Program 7.2 Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations 7.3 Data gathered are analyzed based on evaluation requirements 7.4 Recommendations are submitted based on the findings 7.5 Management support systems are set/established to sustain and enhance the program 7.6 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
1. PPE may include but not limited to:	• Mask • Gloves • Goggles • Safety hat • Overall • Hearing protector • Safety boots
2. Environmental pollution control measures may include but not limited to:	• Methods for minimizing or stopping spread and ingestion of airborne particles • Methods for minimizing or stopping spread and ingestion of gases and fumes • Methods for minimizing or stopping spread and ingestion of liquid wastes
3. Waste management procedures may include but not limited to:	• Sorting • Storing of items • Recycling of items • Disposal of items
4. Resources may include but not limited to:	• Electric • Water • Fuel • Telecommunications • Supplies • Materials
5. Workplace environmental hazards may include but not limited to:	• Biological hazards • Chemical and dust hazards • Physical hazards
6. Organizational systems and procedures may include but not limited to:	• Supply chain, procurement and purchasing • Quality assurance • 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:

- Observation

- Measuring
- Writing
- Communication
- Analytical
- Monitoring
- Evaluation

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.
- Measurement and recording of current resource usage
- 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: 1.1 Controlled environmental hazard 1.2 Controlled environmental pollution 1.3 Demonstrated sustainable resource use 1.4 Evaluated current practices in relation to resource usage 1.5 Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns. 1.6 Described industrial standard environmental practices according to the different environmental issues/concerns. 1.7 Resolved problems/ constraints encountered based on management standard procedures 1.8 Implemented and monitored environmental practices on a periodic basis as per company guidelines 1.9 Recommended solutions for the improvement of the Program 1.10 Monitored and reported to proper authorities any environmental incidents
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 (ex. Cleaning tools, cleaning materials, trash bags, etc.) 2.3 PPE 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 test 3.4 Interview/Third Party Reports 3.5 Portfolio of evidence
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 OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: ENG/OS/TXP/BC/06/5/A

UNIT DESCRIPTION

This unit specifies the competencies required to identify workplace hazards and risk, identify and implement appropriate control measures and implement OSH programs, 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 are identified ***based their indicators*** 1.2 Risks and hazards are evaluated based on legal requirements. 1.3 ***OSH concerns*** raised by workers are addressed as per legal requirements.
2. Control OSH hazards	2.1 Hazard prevention ***and control measures*** are implemented as per legal requirement. 2.2 Risk assessment is conducted and a risk matrix developed based on likely impact. 2.3 ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures.
3. Implement OSH programs	3.1 Company OSH program are identified, evaluated and reviewed based on legal requirements. 3.2 Company OSH programs are implemented as per legal requirements. 3.3 Workers are capacity built on OSH standards and procedures as per legal requirements 3.4 ***OSH-related records*** are maintained as per legal 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. Hazards may include but are not limited to:	• Physical hazards • Biological hazards • Chemical hazards • Ergonomics • Psychological factors • Physiological factors • Safety hazards • Unsafe workers' act
2. Indicators may include but are not limited to:	• Increased of incidents of accidents, injuries • Increased occurrence of sickness or health complaints/ symptoms • Common complaints of workers related to OSH • High absenteeism for work-related reasons
3. Evaluation and/or work environment measurements may include but are not limited to:	• Health Audit • Safety Audit • Work Safety and Health Evaluation • Work Environment Measurements of Physical and Chemical Hazards
4. OSH issues and/or concerns may include but are not limited to:	• Workers' experience/observance on presence of work hazards • Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks) • Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines
5. 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

6. 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
7. Appropriate risk controls	• Eliminate the hazard altogether • Isolate the hazard from anyone who could be harmed • 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
8. Contingency measures may include but are not limited to:	• Evacuation • Isolation • Decontamination • Emergency personnel
9. Emergency procedures may include but are not limited to:	• Fire drill • Earthquake drill • Basic life support/CPR • First aid • Spillage control • Decontamination of chemical and toxic • Disaster preparedness/management • Set of fire-extinguisher
10. 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.
11. OSH-related Records may include but are not limited to:	• Medical/Health records • Incident/accident reports • Sickness notifications/sick leave application • 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:

- Communication
- Interpersonal
- Presentation
- Risk assessment
- Evaluation
- Critical thinking
- Problem solving
- Negotiation

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 counselling 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: 1.1 Identified hazards in the workplace based their indicators 1.2 Evaluated workplace hazards based on legal requirements. 1.3 Addressed OSH concerns raised by workers as per legal requirements. 1.4 Implemented hazard prevention and control measures as per legal requirement.

	1.5 Conducted risk assessment as per legal requirement. 1.6 Developed risk matrix based on likely impact. 1.7 Recognized and established contingency measures in accordance with organization procedures. 1.8 Identified, evaluated and reviewed company OSH program based on legal requirements. 1.9 Implemented company OSH programs as per legal requirements. 1.10 Capacity built workers on OSH standards and procedures as per legal requirements 1.11 Maintained OSH-related records as per legal requirements.
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 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	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.

COMMON UNITS OF COMPETENCY

PREPARE AND INTERPRET TECHNICAL DRAWINGS

UNIT CODE: ENG/OS/TXP/CC/01/5/A

UNIT DESCRIPTION

This unit covers the competencies required to prepare and interpret technical drawings. It involves competencies to select, use and maintain drawing equipment and materials. It also involves producing plain geometry drawings, solid geometry drawings, pictorial and orthographic drawings of components and application of CAD packages.

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. Use and maintain drawing equipment and materials	1.1 ***Drawing equipment*** are identified and gathered according to task requirements 1.2 ***Drawing materials*** are identified and gathered according to task requirements 1.3 Drawing equipment are used and maintained as per manufacturer's instructions 1.4 Drawing materials are used as per workplace procedures 1.5 Waste materials are disposed in accordance with workplace procedures and ***environmental legislations*** 1.6 ***Personal Protective Equipment*** is used according to occupational safety and health regulations

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)***
2. Produce plain geometry drawings	2.1 Different types of lines used in drawing and their meanings are identified according to standard drawing conventions 2.2 Different types of ***geometric forms*** are constructed according to standard drawing conventions 2.3 Different types of angles are constructed according to principles of trigonometry 2.4 Different types of angles are measured using appropriate measuring tools 2.5 Angles are bisected according to standard drawing conventions 2.6 Sketches and drawings of patterns are interpreted according to standard conventions 2.7 Patterns are developed in accordance with standard conventions
3. Produce pictorial and orthographic drawings of components	3.1 Different symbols and abbreviations are identified and their meaning interpreted according to standard drawing conventions 3.2 Isometric sketches and drawings of components are interpreted and produced in accordance with the standard conventions of isometric drawings 3.3 First and third angle orthographic sketches and drawings of components are interpreted and produced in accordance with the standard conventions of orthographic drawings 3.4 Freehand sketching of different types of geometric forms, tools, equipment, diagrams and components is conducted
4. Produce assembly drawings	4.1 Orthographic views are exploded according to standard conventions of orthographic drawings. 4.2 Pictorial views are exploded according to standard conventions of orthographic drawings. 4.3 Part lists are identified according to part to be produced

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)***
	4.4 Sectional views are produced according to standard conventions of drawing. 4.5 Produced drawing is hatched according to standard conventions of drawings.
5. Apply CAD packages in drawing	5.1 CAD packages are selected according to task requirements 5.2 CAD packages are applied in production of plant machine parts.

RANGE

Variable	Range
1. Drawing equipment may include but is not limited to:	• Drawing boards • T-square • Set squares • Drawing set • Computers with CAD packages
2. Drawing materials may include but is not limited to:	• Drawing papers • Pencils • Erasers • Masking tapes • Paper clips
3. Environmental legislations may include but is not limited to:	EMCA 1999
4. Personal Protective Equipment may include but is not limited to:	• Dust coats • Closed leather shoes • Goggles for CAD
5. Geometric forms may include but is not limited to:	• Circles • Triangles • Rectangles • Parallelogram

	• Polygons • Pyramids • Conic sections • Prisms • Loci
6. Standard drawing conventions may include but is not limited to:	• Anatomy of engineering drawing (title block, coordinate grid system, revision block, notes and legends) • Drawing scale (paper size and drawing symbols) • International drawing standards

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:

- Critical thinking
- Drawing
- Interpretation
- Drawing equipment handling
- Analysis and synthesis
- Communication
- Inter personal

Required knowledge

The individual needs to demonstrate knowledge of:

- Drawing equipment and materials
- Freehand sketching
- Lettering
- Geometrical constructions
- Types of drawings
- Types of lines
- Isometric drawing conventions, features, characteristics, components
- Orthographic drawing conventions, features, characteristics, components
- Sketches and drawings of simple patterns

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Applied and adhered to safety procedures 1.2 Cared and maintained drawing equipment 1.3 Interpreted technical diagrams 1.4 Applied appropriate technical standards, used proper tools and equipment for a given task 1.5 Produced sketches and drawings 1.6 Applied CAD packages in production of drawings
2. Resource Implications	Resources the same as that of workplace are advised to be applied. 2.1 Drawing room 2.2 Drawing equipment and materials 2.3 Computers 2.4 CAD packages 2.5 PPE
3. Methods of Assessment	Competency may be assessed through: 3.1 Practical tests 3.2 Observation 3.3 Written tests
4. Context of Assessment	Competency may be assessed individually in the actual workplace or a simulated work place setting or during industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY ENGINEERING MATHEMATICS

UNIT CODE: ENG/OS/TXP/CC/02/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a Textile Processing craft person in order to apply engineering mathematics. It involves competencies required to apply algebra, trigonometry and hyperbolic functions, complex numbers, coordinate geometry, carry out binomial expansion, calculus, solve ordinary differential equations, carry out mensuration, apply power series, statistics, numerical methods, vector theory and matrix.

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. Apply Algebra	1.1 Calculations involving Indices are performed as per the concept 1.2 Calculations involving Logarithms are performed as per the concept 1.3 Scientific calculator is used in solving mathematical problems in line with manufacturer's manual 1.4 Simultaneous equations are performed as per the rules 1.5 Quadratic equations are calculated as per the concept 1.6 Permutations and combinations are performed
2. Apply Trigonometry and hyperbolic functions	2.1 Calculations are performed using trigonometric rules 2.2 Calculations are performed using hyperbolic functions
3. Apply complex numbers	3.1 Complex numbers are represented using Argand diagrams

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.***
	3.2 Operations involving complex numbers are performed 3.3 Calculations involving complex numbers are performed using De Moivre's theorem
4. Apply Coordinate Geometry	4.1 Polar equations are calculated using coordinate geometry 4.2 Graphs of given polar equations are drawn using the Cartesian plane 4.3 Normal and tangents are determined using coordinate geometry
5. Carry out Binomial Expansion	1.1 Roots of numbers are determined using binomial theorem 1.2 Errors of small changes are determined using binomial theorem
6. Apply Calculus	6.1 Derivatives of functions are determined using Differentiation 6.2 Derivatives of hyperbolic functions are determined using Differentiation 6.3 Derivatives of inverse trigonometric functions are determined using Differentiation 6.4 Rate of change and small change are determined using Differentiation. 6.5 Calculation involving stationery points of functions of two variables are performed using differentiation. 6.6 Integrals of algebraic functions are determined using integration 6.7 Integrals of trigonometric functions are determined using integration 6.8 Integrals of logarithmic functions are determined using integration 6.9 Integrals of hyperbolic and inverse functions are determined using integration

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.***
7. Solve Ordinary differential equations	7.1 First order and second order differential equations are solved using the method of undetermined coefficients 7.2 First order and second order differential equations are solved from given boundary conditions
8. Carry out Mensuration	8.1 Perimeter and areas of figures are obtained 8.2 Volume and Surface area of solids are obtained 8.3 Area of irregular figures are obtained 8.4 Areas and volumes are obtained using Pappus theorem
9. Apply Power Series	a. Power series are obtained using Taylor's Theorem b. Power series are obtained using McLaurin's 's theorem
10. Apply Statistics	10.1Mean, median, mode and Standard deviation are obtained from given data 10.2Calculations are performed based on Laws of probability 10.3Calculation involving ***probability distributions,*** mathematical expectation sampling distributions are performed 10.4Sampling distribution methods are applied in data analysis 10.5Calculations involving use of standard normal table, sampling distribution, T-distribution and Estimation are done 10.6Confidence intervals are determined
11. Apply Numerical methods	1.1 Roots of polynomials are obtained using iterative ***numerical methods*** 1.2 Interpolation and extrapolation is performed using numerical methods

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.***
12. Apply Vector theory	12.1Vectors and scalar quantities are obtained in two and three dimensions 12.2***Operations*** on vectors are performed 12.3Position of vectors is obtained 12.4Resolution of vectors is done
13. Apply Matrix	13.1Determinant and inverse of 3x3 matrix are obtained 13.2Solutions of simultaneous equations are obtained 13.3Calculation involving Eigen values and Eigen vectors are performed

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. Operations may include but is not limited to:	• Addition • Subtraction
2. Hyperbolic functions may include but is not limited to:	• Sinh x • Cosh x • Cosec x • Coth x • Tanh x • Sech x
3. Probability Distributions may include but is not limited to:	• Binomial • Poisson • Normal
4. Numerical Methods may include but is not limited to:	• Newton Raphson • Gregory Newton

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 and applying mathematical formulas
- Logical thinking
- Problem solving
- Applying statistics
- Drawing graphs
- Using different measuring tools

Required knowledge

The individual needs to demonstrate knowledge of:

- Fundamental operations (addition, subtraction, division, multiplication)
- Calculating area and volume
- Types and purpose of measuring instruments
- Units of measurement and abbreviations
- Rounding techniques
- Types of fractions
- Types of tables and graphs
- Presentation of data in tables and graphs
- Vector operations
- Matrix operations

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 Applied Trigonometry and hyperbolic functions 1.2 Applied complex numbers 1.3 Applied Calculus 1.4 Solved Ordinary differential equations 1.5 Carried out mensuration 1.6 Applied Power Series 1.7 Applied vectors 1.8 Applied numerical methods 1.9 Applied statistics
2. Resource Implications	The following resources should be provided:

	2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Measuring equipment 2.3 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Demonstration with Oral Questioning 3.3 Written tests
4. Context of Assessment	Competency may be assessed individually in the actual workplace or through accredited institution or during industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY MECHANICAL SCIENCE PRINCIPLES

UNIT CODE: ENG/OS/TXP/CC/03/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a Textile Processing craft person to apply mechanical science principles in their work. It includes determining forces in a system, demonstrating knowledge of moments, understanding friction principles, understanding motions in engineering, describing work, energy and power, performing machine calculations, demonstrating gas principles, applying heat knowledge, applying density knowledge and applying pressure principles.

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. Determine forces in a system	1.1 Forces are defined and described 1.2 ***Forces theorems*** are described 1.3 Resultant of coplanar forces are determined.
2. Demonstrate knowledge of moments	2.1 Moments are defined 2.2 Moments are calculated 2.3 Principles of moments are described 2.4 Couples are identified and applied in engineering systems.
3. Understand friction principles	3.1 Laws of friction are identified 3.2 Limiting friction is calculated 3.3 Forces applied at an angle to a horizontal plane are calculated 3.4 Coefficient of friction is calculated 3.5 Advantages and disadvantages of friction are identified.
4. Understand motions in engineering	4.1 Motion concepts are discussed 4.2 Laws of motion are identified 4.3 Motion calculations are performed 4.4 Displacement/time graphs are applied
5. Describe work, energy and power	5.1 Work is calculated 5.2 Energy is calculated 5.3 Power calculations are performed

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.***
6. Perform machine calculations	6.1 ***Problems on simple machines*** are solved 6.2 Problems on levers are solved 6.3 Laws of machines are identified
7. Demonstrate gas principles	7.1 ***Gas laws*** are identified 7.2 Gas laws are applied in solving engineering problems 7.3 Uses of gases in engineering systems are identified
8. Apply heat knowledge	8.1 Heat concepts are discussed 8.2 Working principle of heat is defined 8.3 Heat capacity is discussed 8.4 Heat problems are solved
9. Apply density knowledge	9.1 ***Density terminology*** are discussed 9.2 Density measurements are carried out 9.3 Density problems are solved
10. Apply pressure principles	10.1 Pressure concepts are discussed 10.2 Working principles of pressure is discussed 10.3 Pressure problems are solved 10.4 ***Pressure applications*** are identified

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. Forces theorems may include but is not limited to:	• Parallelogram • Triangle • Polygon
2. Problems on simple machines may include but is not limited to:	• Machine advantage • Velocity ratio • Efficiency
3. Gas laws may include but is not limited to:	• Boyles law • Charles law

	• Gas equation
4. Density terminology may include but is not limited to:	• Density • Relative density
5. Pressure applications may include but is not limited to:	• Vacuum pump • Hydraulic pump • Hydrometers
6. Principles may include but is not limited to:	• Newton's laws of motion • Law of conservation of linear momentum • Law of conservation of energy • Archimedes' principle
7. Mechanical calculations may include but is not limited to:	• Mechanical advantage • Efficiency • Torque • Power/Energy • Work done
8. Laws of fluids may include but is not limited to:	• Pascal's principle • Gas laws

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:

- Apply basic mechanical formulas
- Use of basic mechanical machines
- Perform various unit conversions of mechanical quantities
- Basic mechanical systems design
- Mechanical machine operation
- Logical thinking
- Problem solving
- Applying statistics
- Drawing graphs
- Using different measuring tools

Required knowledge

The individual needs to demonstrate knowledge of:

- Newton's law
- Levers
- Gear trains
- Laws of conservation of energy

- Laws of friction
- Type of forces
- Thermodynamics
- Calculation of fluid pressure and flow rate
- Mechanical advantage and efficiency calculations
- Properties of materials
- Gas laws
- SI units of mechanical energy.
- Power transmission systems
- Parameters of fluid system
- Operation of mechanical machines
- Mechanical calculation of power, energy, work done, torque and safety factor
- Units of measurement, conversions and abbreviations

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 Determined forces in a system 1.2 Demonstrated knowledge of moments 1.3 Understood friction principles 1.4 Understood motions in engineering 1.5 Described work, energy and power 1.6 Performed machine calculations 1.7 Demonstrated gas principles 1.8 Applied heat knowledge 1.9 Applied density knowledge 1.10 Applied pressure principles
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Measuring tools and equipment 2.3 Sample materials to be tested
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Demonstration with Oral Questioning 3.3 Case studies 3.4 Written tests

4. Context of Assessment	Competency may be assessed individually in the actual workplace through accredited institution or during industrial attachment.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY FLUID MECHANICS PRINCIPLES

UNIT CODE: ENG/OS/TXP/CC/04/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a Textile Processing craft person in order to apply a wide range of fluid mechanics principles in their work. It includes understanding flow of fluids, demonstrating knowledge in viscous flow, performing dimensional analysis and operating fluid pumps

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes that make up workplace function.	**PERFORMANCE CRITERIA** These assessable statements specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range.***
1. Understand flow of fluids	1.1 Flow rate in pipes is measured according to work requirements 1.2 Losses in pipes are determined according to work requirements 1.3 ***Causes of losses*** in pipes are determined according to work requirements 1.4 Flow losses equations are applied in problem solving according to prescribed fluid principles
2. Demonstrate knowledge in viscous flow	2.1 Viscous flow between parallel surfaces are explained according to prescribed fluid principles 2.2 Viscous flow equations between parallel surfaces are derived and applied according to prescribed fluid principles 2.3 Viscous flow equations in circular pipes are derived and applied in problem solving according to prescribed fluid principles
3. Perform dimensional analysis	3.1 Dimensional analysis is explained according to prescribed fluid principles 3.2 Principle of dimensional homogeneity is explained according to prescribed fluid principles 3.3 Fundamental dimensions are stated according to prescribed fluid principles 3.4 Dimensional units are defined according to prescribed fluid principles 3.5 ***Physical quantities*** are identified according to prescribed fluid principles

ELEMENT These describe the key outcomes that make up workplace function.	PERFORMANCE CRITERIA These assessable statements specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range.***
	3.6 Dimensional analysis is applied in problem solving according to prescribed fluid principles
4. Operate fluid pumps	4.1 ***Principle of operation*** of pumps is described according to prescribed fluid principles 4.2 Reciprocating pump equation is derivedaccording to prescribed fluid principles 4.3 Centrifugal pump equation is derivedaccording to prescribed fluid principles 4.4 Pump equations are applied in problem solving according to prescribed fluid principles

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. Causes of losses may include but is not limited to:	• Friction • Enlargement/reduction in cross-sectional areas
2. Physical quantities may include but is not limited to:	• Mass • Force • Density • Velocity • Acceleration
3. Principle of operation may include but is not limited to:	• Reciprocating • Centrifugal

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:

- Apply basic mechanical formulas
- Use of basic mechanical machines
- Perform various unit conversions of mechanical quantities

- Basic mechanical systems design
- Mechanical machine operation
- Logical thinking
- Problem solving
- Applying statistics
- Drawing graphs
- Using different measuring tools

Required knowledge

The individual needs to demonstrate knowledge of:

- Newton's law
- Levers
- Gear trains
- Laws of conservation of energy
- Laws of friction
- Type of forces
- Thermodynamics
- Calculation of fluid pressure and flow rate
- Mechanical advantage and efficiency calculations
- Gas laws
- SI units of mechanical energy.
- Power transmission systems
- Parameters of fluid system
- Operation of mechanical machines
- Mechanical calculation of power, energy, work done, torque and safety factor
- Units of measurement, conversions and abbreviations

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 Principles of mechanical science 1.2 Performed mechanical calculations of a system 1.3 Identified types of forces on a system 1.4 Calculated resultant forces on plane framework 1.5 Identified application of forces on the production flow 1.6 Tested mechanical properties of a materials 1.7 Identified tools and equipment for measuring system parameters 1.8 Recorded and interpreted measured parameters. 1.9 Operated Power transmission systems

2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Measuring tools and equipment 2.3 Sample materials to be tested
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Demonstration with Oral Questioning 3.3 Case studies 3.4 Written tests
4. Context of Assessment	Competency may be assessed individually in the actual workplace or through accredited institution or during industrial attachment.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

APPLY MATERIAL SCIENCE

UNIT CODE: ENG/OS/TXP/CC/05/5/A

UNIT DESCRIPTION

The learner will be introduced to performing material testing and metallurgical processes. It involves analyzing properties of engineering materials, performing extraction processes, producing iron materials, ceramics, composites and alloys, performing heat treatment, material testing and identifying corrosion and its prevention

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. Analyze properties of engineering materials	1.1 Type of engineering materials is identified as per the procedures 1.2 ***Physical properties*** of engineering material are determined 1.3 ***Mechanical properties*** of engineering materials are tested 1.4 Crystal structure of materials is analyzed
2. Perform ore extraction processes	2.1 Safety procedures are observed according OSHA 2.2 Method of extraction is determined as per material properties and its composition 2.3 Procedure in extraction process is determined as per extraction method 2.4 Extraction by- products are stored as per SOPs 2.5 Extraction by- products are disposed as per SOPs
3. Produce iron materials	3.1 Perform ore smelting according to standard operating procedures. 3.2 ***Composition of iron*** is determined 3.3 Method of producing ***iron material*** is established 3.4 Refinement processes are identified based on iron material required
4. Produce alloy materials	4.1 Materials in alloy formation are identified

	4.2 Alloy formation process is identified based on alloy to be produced 4.3 Alloy tested based on alloy production requirement
5. Produce non-ferrous materials	5.1 ***Non-ferrous materials*** are extracted according to SOP 5.2 Extracted non-ferrous material is smelted and purified as per the SOP 5.3 Non-ferrous material is tested according to SOP 5.4 Alloying elements for non-ferrous materials are identified 5.5 Alloy formation process is identified based on alloy to be produced 5.6 Alloys for non-ferrous material are tested based on production requirement
6. Produce ceramics materials	6.1 Composition of ***ceramic materials*** is identified 6.2 Manufacturing process is identified 6.3 Ceramic materials are produced according to manufacturing processes 6.4 ***Finishing processes*** are identified
7. Produce composite materials	7.1 Type of composite to be produced is identified 7.2 Elements involve in composite formation are identified 7.3 Formation process of composite to be produced is identified 7.4 Composite is tested as per composite production requirement
8. Utilise ***other engineering materials***	8.1 Identify and select engineering material according to production requirements. 8.2 Operation plan is developed according to engineering drawing. 8.3 Appropriate machine is set up according to manufacturer's manual 8.4 Production parameters are set according to production requirement 8.5 Production is performed
9. Perform heat treatment	*9.1* Safety practices are observed according to OSHA 2007 9.2 ***Heat treatment processes*** are identified 9.3 Procedure in heat treatment processes

	9.4 Heat treatment of metals are performed
10. Perform material testing	10.1 Safety is observed in material testing procedures 10.2 ***Material testing methods*** are identified depending on material to be tested 10.3 Procedure of material testing is followed as per material testing method 10.4 Material testing results are tabulated, calculated and interpreted 10.5 Material testing equipment are taken care of and maintained.
11. Prevent material corrosion	11.1 Safety is observed during corrosion prevention 11.2 ***Corrosion type*** is identified 11.3 Corrosive atmosphere is identified 11.4 ***Methods of corrosion prevention*** are identified 11.5 Corrosion is prevented

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. Mechanical properties may include but is not limited to:	• Ductility • Malleability • Elasticity • Toughness • Hardness • Brittleness • Plasticity • Strength
2. Physical properties may include but is not limited to:	• Density • Color • Texture • Melting point • Thermo conductivity • Electrical resistivity
3. Composition of iron may include but is not limited to:	• Iron (II) oxide • Iron (III) oxide

VARIABLE	RANGE
1. Mechanical properties may include but is not limited to:	• Ductility • Malleability • Elasticity • Toughness • Hardness • Brittleness • Plasticity • Strength
2. Physical properties may include but is not limited to:	• Density • Color • Texture • Melting point • Thermo conductivity • Electrical resistivity
4. Ceramic materials may include but is not limited to:	• Cast iron • Steel • Oxides • Nitrides • Carbides • Silica
5. Finishing processes may include but is not limited to:	• Lapping • Fine grinding • Polishing
6. Corrosion type may include but is not limited to:	• Galvanic • Stress corrosion cracking
7. Methods of corrosion prevention may include but is not limited to:	• Painting • Electroplating • Galvinizing • Cathodic • Chromizing

REQUIRED KNOWLEDGE AND SKILLS

The individual needs to demonstrate the following skills

Required Skills

- Measuring and marking
- Material testing

- Use of hand tools
- Inspection and testing

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

- Occupational Health and Safety Act of Kenya laws 2007 with focus on personal safety, machine safety and workplace
- National Environment Management Authority Act, Kenya 2004
- OSH ACT 2007
- Equipment manuals
- Mathematics & science
- Physics and mechanics
- Metallurgy and materials
- Inspection and testing
- WIBA ACT
- Report writing

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 learner 1.1 Observed safety as per work place procedures 1.2 Demonstrated understanding of physical, chemical and mechanical properties of engineering materials 1.3 Performed extraction processes 1.4 Produced iron materials 1.5 Produced ceramics 1.6 Produced composites 1.7 Produced alloys 1.8 Performed heat treatment 1.9 Performed material testing 1.10 Demonstrated understanding of corrosion types and its prevention
2. Resource Implications	2.1 Testing materials 2.2 Extraction materials 2.3 Measuring instruments 2.4 Inspection tools

3. Methods of Assessment	Competency may be accessed through: 3.1 The behaviour of the learner in the working environment 3.2 Inpection of finished product 3.3 Process analysis
4. Context of Assessment	Competency may be assessed individually in the actual workplace or through accredited institution or during industrial attachment.
5. Guidance information for assessment	Holistic assessment of other units relevant to the industry sector, workplace and job role is recommended.

CORE UNITS OF COMPETENCY

PRODUCE PRE-TREATED TEXTILES

UNIT CODE: ENG/OS/TXP/CR/01/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a textile processing craft person to produce pre-treated textiles. It involves competencies required to obtain grey fabric, inspect grey fabric, carry out singeing, carry out desizing, carry out scouring, carry out bleaching, carry out mercerization carry out washing and document pre-treatment process.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the Range)***
1. Obtain grey fabric	1.1 Work order is received and interpreted according to customer requirements 1.2 Requisition for grey fabric is prepared and issued according to organisational procedures 1.3 Grey fabric is obtained according to organisational procedures 1.4 Grey fabric is delivered to inspection laboratory according to organisational procedures
2. Inspect grey fabric	2.1 Safety is observed according to OSH act 2.2 Grey fabric reference standards are obtained according to organisational procedures 2.3 Grey fabric is loaded onto inspection machine according to operation procedure 2.4 Surface inspection is carried out according to operation procedure and organisational procedures 2.5 ***Grey fabric faults*** identified are corrected where possible according to quality requirements 2.6 Inspected grey fabric is doffed off according to organisational procedures

	2.7 Inspected grey fabric is stored according to organisational procedures
3. Carry out singeing	3.1 Safety is observed according to OSH act 3.2 Grey fabric is loaded onto singeing machine according to operation procedure 3.3 Flame intensity is adjusted according fabric properties 3.4 Speed of fabric is adjusted according to the quality requirements 3.5 Distance between flame and fabric is adjusted according to fabric properties and quality requirements 3.6 Angle of the flame is adjusted according to fabric properties and quality requirements 3.7 Singeing machine is operated according to operation procedures 3.8 Singeing process is monitored according to SOP. 3.9 ***Singeing faults*** are identified and rectified where possible according to SOP 3.10 Singed fabric rolls are doffed according to SOP. 3.11 Singed fabric rolls are stored according to organizational procedures.
4. Carry out desizing	4.1 Safety is observed according to OSH act 4.2 Desizing recipe is prepared according to organisational procedures 4.3 Grey fabric is loaded onto desizing machine according to operation procedure 4.4 Desizing machine parameters are set according to operation manual 4.5 Desizing rotation time of the batch is set according to quality requirement 4.6 Desizing machine is operated according to operation procedures 4.7 Desizing process is monitored according to SOP. 4.8 ***Desizing faults*** are identified and rectified where possible according to SOP 4.9 Desized fabric rolls are doffed according to SOP.

	4.10 Desized fabric rolls are stored according to organizational procedures.
5. Carry out scouring	5.1 Safety is observed according to OSH act 5.2 Scouring recipe is prepared according to organisational procedures 5.3 Grey fabric is loaded onto scouring machine according to operation procedure 5.4 Scouring machine parameters are set according to operation manual 5.5 Scouring machine is operated according to operation procedures 5.6 ***Scouring process parameters*** are monitored according to SOP. 5.7 ***Scouring faults*** are identified and rectified where possible according to SOP 5.8 Scoured fabric rolls are doffed according to SOP. 5.9 Scoured fabric rolls are stored according to organizational procedures.
6. Carry out bleaching	6.1 Safety is observed according to OSH act 6.2 Bleaching recipe is prepared according to organisational procedures 6.3 Grey fabric is loaded onto bleaching machine according to operation procedure 6.4 Bleaching machine parameters are set according to operation manual 6.5 Steam parameters are set according to operation manual 6.6 Bleaching machine is operated according to operation procedures 6.7 Bleaching process is monitored according to SOP. 6.8 ***Bleaching faults*** are identified and rectified where possible according to SOP 6.9 Washing off is carried according to quality requirements 6.10 Bleached fabric rolls are doffed according to SOP. 6.11 Bleached fabric rolls are stored according to organizational procedures.

7. Carry out mercerization	7.1 Safety is observed according to OSH act 7.2 ***Mercerization recipe*** is prepared according to organisational procedures 7.3 Grey fabric is loaded onto mercerization machine according to operation procedure 7.4 Mercerization machine parameters are set according to operation manual 7.5 Mercerization machine is operated according to operation procedures 7.6 Mercerization process is monitored according to SOP. 7.7 ***Mercerization faults*** are identified and rectified where possible according to SOP 7.8 Washing off and neutralization of the fabric is carried out according organisational procedure 7.9 Mercerized fabric rolls are doffed according to SOP. 7.10 Mercerized fabric rolls are stored according to organizational procedures.
8. Carry out Washing	8.1 Safety is observed according to OSH act 8.2 Washing recipe is prepared according to organisational procedures 8.3 Grey fabric is loaded onto washing machine according to operation procedure 8.4 Washing machine parameters are set according to operation manual 8.5 Washing machine is operated according to operation procedures 8.6 Washing process is monitored according to SOP. 8.7 ***Washing faults*** are identified and rectified where possible according to SOP 8.8 Washed fabric rolls are doffed according to SOP. 8.9 Washed fabric rolls are stored according to organizational procedures.
9. Document Pre-treatment Process	9.1 Documentation tools are obtained according to organisational procedures

	9.2 Pre-treatment quality control tests are documented according to organisational procedures 9.3 Pre-treatment process is documented according to organisational procedures 9.4 Report is generated according to organizational procedures

RANGE

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

Variable	Range
1. Grey fabric faults may include but is not limited to:	• Oil stains • Slubs • Hole • Missing yarn • Fly contact
2. Singeing faults may include but is not limited to:	• Uneven singeing • Incomplete singeing • Thermal damage
3. Desizing faults may include but is not limited to:	• Incomplete desizing • Uneven desizing
4. Scouring process parameters may include but is not limited to:	• Caustic soda concentration • Alkali concentration • Temperature • Reaction time
5. Scouring faults may include but is not limited to:	• Incomplete scouring • Stains
6. Bleaching recipe may include but is not limited to:	• Sodium hypo chloride • Hydrogen peroxide
7. Bleaching faults may include but is not limited to:	• Uneven bleaching • Harsh bleaching • Iron stains

Variable	Range
	• Alkalinity remnants
8. Mercerization recipe may include but is not limited to:	• Ammonia • Caustic soda
9. Mercerization faults may include but is not limited to:	• Ammonia faults
10. Washing faults may include but is not limited to:	• Poor smell • Poor brightness • Poor hand feel • Over blasting

REQUIRED KNOWLEDGE

The individual needs to demonstrate knowledge of:

- Properties of textile raw materials
- Different types of yarns
- Different kinds of fabrics
- Required fabric characteristics
- Required fabric type and properties
- Source of fabric
- Fabric quality
- Standard operating procedures (SOP) to follow
- Sample selection methods
- Surface inspection
- Basic quantitative analysis test and methods
- Fabric grading
- Singeing process, faults and remedies
- Machine parts and components
- Machine operation
- Machine parameters
- desizing process, faults and remedies
- Scouring process, faults and remedies
- Bleaching process, faults and remedies
- Mercerization process, faults and remedies
- Applicable textile standards
- Safety practices and procedures
- Documentation
- Procedure for safe disposal of waste materials

- Mathematics understanding
- Physics

REQUIRED SKILLS

The individual needs to demonstrate skills in:

- Sample collection
- Required fabric selection
- Order placement
- Material reception
- Surface inspection
- Quantitative analysis
- Fabric grading
- Observe safety
- Fabric speed control
- Flame height adjustment
- Machine operation
- Perform desizing, check faults and remedies
- Perform singeing, check faults and remedies
- Perform scouring, check faults and remedies
- Perform bleaching, check faults and remedies
- Perform mercerizing, check faults and remedies
- Follow standard operating procedures
- Planning and sequencing tasks
- Identifying non-compliances
- Communication skills– oral/written
- Manage work efficiently
- Time management
- Troubleshooting
- House keeping
- Effective communication
- Energy conservation
- Good decision making
- Time management
- Report writing
- Record keeping

EVIDENCE GUIDE

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

1	Critical Aspects of Competency.	1.1 Obtained grey fabric 1.2 Inspected grey fabric 1.3 Carried out singeing

		1.4 Carried out desizing 1.5 Carried out scouring 1.6 Carried out bleaching 1.7 Carried out mercerization 1.8 Carried out washing 1.9 Documented pre-treatment process
2	Resource Implications.	2.1 Fabric lot 2.2 Desizing machine 2.3 Singeing machine 2.4 Bleaching machine 2.5 Scouring machine 2.6 Mercerizing machine 2.7 Washing machine 2.8 Bleaching chemicals 2.9 Washing chemicals 2.10 Mercerizing chemicals 2.11 Scouring chemicals 2.12 pH scale 2.13 PPE 2.14 Thermometer 2.15 Rotating batcher 2.16 Fabric Beams 2.17 Documentation tool and equipment
3	Methods of Assessment.	***Competency may be assessed through:*** 3.1 Practical 3.2 Observation 3.3 Questionnaire 3.4 Case studies 3.5 Written examinations 3.6 Oral presentation
4	Context of Assessment.	Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions or during industrial attachment.
5	Guidance information for assessment.	This unit may be assessed on an integrated basis with others within this occupational sector.

PRODUCE DYED TEXTILES

UNIT CODE: ENG/OS/TXP/CR/02/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a textile processing craft person to produce dyed textiles. It involves competencies required to obtain textile for dyeing, prepare dyeing recipe, set up dyeing machine, carry out dyeing, carry out washing off and document dyeing process.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the Range)***
1 Obtain Textile Material for Dyeing	1.1 Work order is received and interpreted according to customer requirements 1.2 Requisition for textile material is prepared and issued according to organisational procedures 1.3 ***Textile material*** is obtained according to organisational procedures 1.4 Textile material sample is delivered to laboratory for analysis according to organisational procedures
2 Prepare Dyeing Recipe	2.1 Safety is observed according to OSH act 2.2 Standard sample and/or pantone shade card is obtained according to organisational procedures 2.3 Dyeing recipe components are obtained according to organisational procedures 2.4 Dyeing stuffs are weighed separately on precision balance according to organisational procedures 2.5 Dyeing recipe is developed with details like dyeing cycle and material to liquor ratio (MLR) 2.6 Shade developed is checked against standard sample shade 2.7 Equipment is monitored for smooth process according to organisational procedures
3 Set Up Dyeing Machine	3.1 Safety is observed according to OSH act 3.2 Machine operation manual is obtained according to organisational procedures 3.3 ***Necessary tools and consumables*** are obtained according to operation manual

		3.4 Textile material beam is obtained according to product specifications. 3.5 Pre-treated beam is mounted onto dyeing machine according to manufacturer's manual and product design. 3.6 Dyeing machine parameters are set up according to operation manual
4	Carry Out Dyeing	4.1 Safety is observed according to OSH act 4.2 Textile material is loaded onto dyeing machine according to operation procedure 4.3 Dyeing machine parameters are set according to operation manual 4.4 Dyeing machine is operated according to operation procedures 4.5 ***Dyeing process parameters*** is monitored according to SOP. 4.6 ***Dyeing faults*** are identified and rectified where possible according to SOP 4.7 Dyed fabric rolls are doffed according to SOP. 4.8 Dyed fabric rolls are stored according to organizational procedures.
5	Carry Out Washing Off	5.1 Safety is observed according to OSH act 5.2 Washing recipe is prepared according to organisational procedures 5.3 Textile material is loaded onto washing machine according to operation procedure 5.4 Washing machine parameters are set according to operation manual 5.5 Washing machine is operated according to operation procedures 5.6 Washing process is monitored according to SOP. 5.7 ***Washing faults*** are identified and rectified where possible according to SOP 5.8 Washed textile material rolls are doffed according to SOP. 5.9 Washed textile material rolls are stored according to organizational procedures.
6	Document Dyeing Process	6.1 Documentation tools are obtained according to organisational procedures 6.2 Dyeing quality control tests are documented according to organisational procedures

	6.3 Dyeing process is documented according to organisational procedures 6.4 Report is generated according to organizational procedures

RANGE

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

Variable	Range
1. Textile material may include but is not limited to:	• Yarn • Fabric
2. Necessary tools and consumables may include but is not limited to:	• Oil • Grease
3. Dyeing process parameters may include but is not limited to:	• Speed of machine • Chemical recipe • Steamer temperature • Steamer dwelling
4. Dyeing faults may include but is not limited to:	• Uneven dyeing • Dye spot • Shade variation
5. Washing faults may include but is not limited to:	• Poor smell • Poor brightness • Poor hand feel • Over blasting

REQUIRED KNOWLEDGE

The individual needs to demonstrate knowledge of:

- Dyeing process, faults and remedies
- Machine parts and components
- Machine faults
- Machine parameters
- Standard operating procedures(SOP) of dyeing
- Dyeing recipe
- Chemical neutralization
- Dyeing methods

- Washing methods
- Fabric quality
- Safety practices and procedures
- Documentation
- Procedure for safe disposal of waste materials
- Mathematics understanding
- Physics

REQUIRED SKILLS

The individual needs to demonstrate skills in:

- Perform dyeing process
- Check dye faults and remedies
- Observe safety
- Prepare dyeing recipe
- Adjust machine parameters
- Check pick up of fabric
- Machine operation
- Planning and sequencing tasks
- Identifying non-compliances
- Effective communication skills– oral/written
- Data collection
- Manage work efficiently
- Time management
- Supply chain operations
- Sense color effectively
- Troubleshooting
- House keeping
- Energy conservation
- Good decision making
- Time management
- Report writing
- Record keeping

EVIDENCE GUIDE

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

1. Critical Aspects of Competency.	1.1 Obtained textile for dyeing 1.2 Prepared dyeing recipe 1.3 Set up dyeing machine 1.4 Carried out dyeing 1.5 Carried out washing off 1.6 Documented dyeing process.

2. Resource Implications.	2.1 Fabric 2.2 Yarn 2.3 PPE 2.4 Dyes and chemicals 2.5 Dyeing machine 2.6 Washing chemicals 2.7 Thermometer 2.8 Pantone shade card 2.9 Documentation tool and equipment
3. Methods of Assessment.	***Competency may be assessed through:*** 3.1 Practical 3.2 Observation 3.3 Questionnaire 3.4 Case studies 3.5 Written examinations 3.6 Oral presentation
4. Context of Assessment.	Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions or during industrial attachment.
5. Guidance information for assessment.	This unit may be assessed on an integrated basis with others within this occupational sector.

PRODUCE PRINTED FABRICS

UNIT CODE: ENG/OS/TXP/CR/03/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a textile processing craft person to produce printed fabrics. It involves competencies required to obtain fabric for printing, prepare printing recipe, prepare print screen, set up printing machine, operate printing machine and document printing process

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the Range)***
1. Obtain Fabric for Printing	1.1 Work order is received and interpreted according to customer requirements 1.2 Requisition for fabric is prepared and issued according to organisational procedures 1.3 Fabric is obtained according to organisational procedures 1.4 Fabric is delivered to inspection laboratory according to organisational procedures
2. Prepare Printing Recipe	2.1 Safety is observed according to OSH act 2.2 Standard sample and/or pantone shade card is obtained according to organisational procedures 2.3 ***Printing method*** is determined according to product requirement 2.4 ***Printing recipe components*** are obtained according to organisational procedures 2.5 Printing chemicals are weighed separately on precision balance according to organisational procedures 2.6 Printing recipe mixing is done according to organisational procedures 2.7 Shade developed is checked against standard sample shade 2.8 Equipment is monitored for smooth process according to organisational procedures
3. Prepare Print Screen	3.1 Emulsion is mixed according to organisational procedures 3.2 Screen is cleaned according to organisational procedures and quality requirements

	3.3 Screen is dried according to organisational procedures and quality requirements 3.4 Artwork is obtained according to organisational procedures 3.5 Screen is exposed to UV according to organisational procedures 3.6 Screen is rinsed according to organisational procedures
4. Set Up Printing Machine	4.1 Safety is observed according to OSH act 4.2 Machine operation manual is obtained according to organisational procedures 4.3 ***Necessary tools and consumables*** are obtained according to operation manual 4.4 Fabric beam is obtained according to product specifications. 4.5 Fabric beam is mounted onto printing machine according to manufacturer's manual and product design. 4.6 Printing machine parameters are set up according to operation manual
5. Operate Printing Machine	5.1 Machine safety and operation procedures are observed according to manufacturer manuals and OSHA 5.2 Printing machine is operated to workplace procedure 5.3 Printing process is monitored according to SOP. 5.4 ***Printing faults*** are identified and rectified where possible according to SOP 5.5 Major faults are reported according to SOP 5.6 Printed fabric rolls are doffed according to SOP. 5.7 Printed fabric rolls are stored according to organizational procedures. 5.8 Printing waste is disposed according to organisational procedure
6. Document Printing Process	6.1 Documentation tools are obtained according to organisational procedures 6.2 Printing quality control tests are documented according to organisational procedures 6.3 Printing process is documented according to organisational procedures 6.4 Report is generated according to organizational procedures

RANGE

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

Variable	Range
1. Printing methods may include but is not limited to:	• Block printing • Screen printing • Roller printing • Heat transfer printing • Digital printing
2. Printing recipe components may include but is not limited to:	• Thickener • Wetting agents • Dyestuff of pigments • Defoaming agents • Oxidizing and reducing agents • Solvent dispersing agents
3. Necessary tools and equipment may include but is not limited to:	• Oil • Grease • Grease gun
4. Printing faults may include but is not limited to:	• Bleeding • Stick-ins • Flushing/wicking • Unwanted pigment marking on fabric • Crack or miss alignment in transfer printed fabric • Color out

REQUIRED KNOWLEDGE

The individual needs to demonstrate knowledge of:

- Printing process, faults, and remedies
- Machine parts and components
- Printing faults
- Standard operating procedures (SOP) of printing
- Printing components
- Printing methods
- Washing methods
- Printing quality parameters

- Safety practices and procedures
- Documentation
- Procedure for safe disposal of waste materials
- Mathematics understanding
- Physics

REQUIRED SKILLS

The individual needs to demonstrate skills in:

- Perform printing process
- Check printing faults and remedies
- Observe safety
- Prepare printing recipe
- Adjust machine parameters
- Machine operation
- Planning and sequencing tasks
- Identifying non-compliances
- Effective communication skills– oral/written
- Data collection
- Manage work efficiently
- Time management
- Sense color effectively
- Troubleshooting
- House keeping
- Energy conservation
- Good decision making
- Time management
- Report writing
- Record keeping

EVIDENCE GUIDE

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

1. Critical Aspects of Competency.	1.1 Obtained fabric for printing 1.2 Prepared printing recipe 1.3 Prepared print screen 1.4 Set up printing machine 1.5 Operated printing machine 1.6 Documented printing process

2. Resource Implications.	2.1 Fabric 2.2 PPE 2.3 Printing chemicals 2.4 Printing machine 2.5 Washing chemicals 2.6 Thermometer 2.7 Printing reference standards 2.8 Printing samples 2.9 Documentation tool and equipment
3. Methods of Assessment.	***Competency may be assessed through:*** 3.1 Practical 3.2 Observation 3.3 Questionnaire 3.4 Case studies 3.5 Written examinations 3.6 Oral presentation
4. Context of Assessment.	Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions.
5. Guidance information for assessment.	This unit may be assessed on an integrated basis with others within this occupational sector.

PERFORM TEXTILE FINISHING

UNIT CODE: ENG/OS/TXP/CR/04/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a textile processing craft person to perform textile finishing. It involves competencies required to obtain fabric for finishing, set up finishing machine, carry out mechanical finishes, carry out chemical finishes and document finishing process.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the Range)***
1. Obtain Fabric for Finishing	1.1 Work order is received and interpreted according to customer requirements 1.2 Requisition for fabric is prepared and issued according to organisational procedures 1.3 Fabric is obtained according to organisational procedures
2. Set Up Finishing Machine	2.1 Safety is observed according to OSH act 2.2 Machine operation manual is obtained according to organisational procedures 2.3 ***Necessary tools and consumables*** are obtained according to operation manual 2.4 Fabric beam is obtained according to product specifications. 2.5 Fabric beam is mounted onto finishing machine according to manufacturer's manual and product design. 2.6 Finishing machine parameters are set up according to operation manual
3. Carry out Mechanical Finishes	3.1 Safety is observed according to OSH act 3.2 Chemical finishes recipe is prepared according to organisational procedures 3.3 Fabric is loaded onto finishing machine according to operation procedure 3.4 Mechanical finishing machine parameters are set according to operation manual

	3.5 Mechanical finishing machine is operated according to operation procedures 3.6 Mechanical finishing process parameters are monitored according to SOP. 3.7 ***Mechanical finishing faults*** are identified and rectified where possible according to SOP 3.8 Finished fabric rolls are doffed according to SOP. 3.9 Finished fabric rolls are stored according to organizational procedures.
4. Carry out Chemical Finishes	4.1 Safety is observed according to OSH act 4.2 Chemical finishes recipe is prepared according to organisational procedures 4.3 Fabric is loaded onto finishing machine according to operation procedure 4.4 Chemical finishing machine parameters are set according to operation manual 4.5 Chemical finishing machine is operated according to operation procedures 4.6 Chemical finishing process parameters are monitored according to SOP. 4.7 ***Chemical finishing faults*** are identified and rectified where possible according to SOP 4.8 Finished fabric rolls are doffed according to SOP. 4.9 Finished fabric rolls are stored according to organizational procedures.
5. Document Finishing Process	5.1 Documentation tools are obtained according to organisational procedures 5.2 Finishing process quality control tests are documented according to organisational procedures 5.3 Finishing process is documented according to organisational procedures 5.4 Report is generated according to organizational procedures

RANGE

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

Variable	Range
1. Necessary tools and equipment may include but is not limited to:	• Grease gun • Oil • Grease
2. Mechanical finishing faults may include but is not limited to:	• Pilling • Pin holes • Selvage torn • Tear fabric • Inadequate pressing • Loose threads
3. Chemical finishing faults may include but is not limited to:	• Decolorized patch • Water spot • Unwanted marks on fabrics

REQUIRED KNOWLEDGE

The individual needs to demonstrate knowledge of:

- Safety
- Mechanical finishing faults
- Chemical finishing faults
- Fabric properties
- Different kinds of fabrics
- Required fabric characteristics
- Required fabric type and properties
- Fabric quality
- Standard operating procedures (SOP) to follow
- Surface inspection
- Basic quantitative analysis test and methods
- Fabric grading
- Mechanical finishing machines parts and components
- Mechanical finishing machines operation
- Mechanical finishing machines parameters
- Chemical finishing machines parts and components
- Chemical finishing machines operation
- Chemical finishing machines parameters
- Documentation
- Procedure for safe disposal of waste materials
- Mathematics understanding
- Physics
- Fabric finishing reference standards

REQUIRED SKILLS

The individual needs to demonstrate skills in:

- Observe safety
- Rectify Mechanical finishing faults
- Rectify Chemical finishing faults
- Identify Fabric properties
- Inspect fabric quality
- Observe Standard operating procedures (SOP)
- Perform Surface inspection
- Carry out basic quantitative analysis test and methods
- Perform fabric grading
- Identify mechanical finishing machines parts and components
- Operate mechanical finishing machines
- Identify mechanical finishing machines parameters
- Identify chemical finishing machines parts and components
- Operate chemical finishing machines.
- Identify chemical finishing machines parameters
- Communication skills– oral/written
- Manage work efficiently
- Time management
- Supply chain operations
- Troubleshooting
- House keeping
- Effective communication
- Energy conservation
- Good decision making
- Time management
- Report writing
- Record keeping

EVIDENCE GUIDE

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

1	Critical Aspects of Competency.	1.1 Obtained fabric for finishing 1.2 Set up finishing machine 1.3 Carried out mechanical finishes 1.4 Carried out chemical finishes 1.5 Documented finishing process

2	Resource Implications.	2.1 Chemical finishing machines 2.2 Mechanical finishing machines 2.3 Chemical reagents 2.4 Fabric 2.5 Reference standards 2.6 PPEs 2.7 Documentation tool and equipment
3	Methods of Assessment.	***Competency may be assessed through:*** 3.1 Practical 3.2 Observation 3.3 Questionnaire 3.4 Case studies 3.5 Written examinations 3.6 Oral presentation
4	Context of Assessment.	Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions or during industrial attachment.
5	Guidance information for assessment.	This unit may be assessed on an integrated basis with others within this occupational sector.

PERFORM QUALITY CONTROL

UNIT CODE: ENG/OS/TXP/CR/05/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a textile processing craft person to perform quality control. It involves competencies required to obtain fabric sample, prepare fabric sample, set up machine, test textile material, grade final fabric and document inspection results.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements ***(Bold and italicized terms are elaborated in the Range)***
1 Obtain Textile Material Sample	1.1 Work order is received and interpreted according to customer requirements 1.2 Requisition for textile material sample is prepared and issued according to organisational procedures 1.3 Textile material sample is obtained according to organisational procedures 1.4 Textile material sample is delivered to inspection laboratory according to organisational procedures
2 Prepare Fabric Sample	2.1 Safety is observed according to OSH act 2.2 ***Tools and equipment*** to prepared samples are obtained according to organisational procedures 2.3 Textile material samples are conditioned according to test specification.
3 Set Up Machine	3.1 Safety is observed according to OSH act 3.2 Machine operation manual is obtained according to organisational procedures 3.3 ***Necessary tools and consumables*** are obtained according to operation manual 3.4 Textile material sample is mounted onto testing machine according to manufacturer's manual and product design. 3.5 Testing machine parameters are set up according to operation manual

4	Test Textile Material	4.1 Test environment is conditioned according to specified standard. 4.2 ***Textile material test*** is identified according to job specification. 4.3 Textile material testing standards are obtained according to organisational procedures. 4.4 ***Textile material testing equipment*** are selected and set up according test specification. 4.5 Prescribed test is carried out according to job specification.
5	Grade Final Fabric	5.1 Textile material quality reference standards are obtained according to organisational procedures 5.2 Inspected textile material characteristics are identified according to quality requirements 5.3 Inspected textile material characteristics are interpreted according to quality and customer requirements 5.4 Inspected textile material is graded according acceptable quality and customer requirements 5.5 Graded textile material is packaged and stored according to organisation procedures
6	Document Inspection Results	6.1 Documentation tools are obtained according to organisational procedures 6.2 Inspection result is documented according to organisational procedures 6.3 Report is generated according to organizational procedures

RANGE

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

Variable	**Range**
1. Tools and equipments may include but is not limited to:	• GSM cutter • Tape measure
2. Necessary tools and consumables may	• Greasing gun • Grease • Oil

Variable	Range
include but is not limited to:	
3. Textile material test may include but is not limited to:	• Bursting strength • Pilling • Tensile strength • Wrinkle recovery • Tearing strength
4. Textile material testing equipment may include but is not limited to:	• Bursting strength tester • Pilling tester • Tensile strength tester • Wrinkle recovery tester • Tearing strength tester

REQUIRED KNOWLEDGE

The individual needs to demonstrate knowledge of:

- Properties of textile materials
- Textile testing equipment
- Identification of textile material defects and faults
- Fault rectification techniques
- Applicable textile standards
- Safety practices and procedures
- Sampling techniques
- Documentation
- Principle of testing
- Textile processes
- Interpretation of test results
- Mathematics understanding
- Physics
- Inspection reference standards

REQUIRED SKILLS

The individual needs to demonstrate skills in:

- Inspection of textile products
- Testing of textile Material
- Control of textile testing equipment
- Correcting process defects
- Sample preparation
- Grading

- Interpreting and following information on written job instructions, manufacturer specifications, standard operating procedures, charts, lists, reports and other applicable reference documents
- Checking and clarifying information
- Planning and sequencing tasks
- Identifying non-compliances
- Communication skills– oral/written
- Data collection
- Manage work efficiently
- Time management
- Troubleshooting
- House keeping
- Effective communication
- Application of safety procedures
- Energy conservation
- Good decision making
- Time management
- Report writing

EVIDENCE GUIDE

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

1. Critical Aspects of Competency.	1.1 Obtained fabric sample 1.2 Prepared fabric sample 1.3 Set up machine 1.4 Tested textile material 1.5 Graded final fabric 1.6 Documented inspection results.

2. Resource Implications.	2.1 Grey fabric sample 2.2 Processed fabric 2.3 Finished fabric 2.4 Tailor Chalk 2.5 Polythene Sheets 2.6 Spectrophotometer 2.7 Nipper 2.8 Pointer 2.9 Comb 2.10 Fault marker 2.11 GSM cutter 2.12 Magnifying glass 2.13 Ends, picks per inch counter 2.14 Needle 2.15 Inspection table 2.16 Inspection machine 2.17 Inspection laboratory 2.18 Documentation tool and equipment
3. Methods of Assessment.	***Competency may be assessed through:*** 3.1 Practical 3.2 Observation 3.3 Questionnaire 3.4 Case studies 3.5 Written examinations 3.6 Oral presentation
4. Context of Assessment.	Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions.
5. Guidance information for assessment.	This unit may be assessed on an integrated basis with others within this occupational sector.

PERFORM MACHINE MAINTENANCE

UNIT CODE: ENG/OS/TXP/CR/06/5/A

UNIT DESCRIPTION

This unit describes the competencies required by a Textile Processing craft person to perform machine maintenance. It involves competencies required to maintain textile processing machine, adjust textile processing machine parts, repair textile processing machine and document maintenance operation.

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 Maintain textile processing machine	1.1 Machinery safety is observed according to OSH act 1.2 Maintenance schedule is developed according manufacturer's instruction and organisation procedures 1.3 Machine parts are inspected according to operation manual 1.4 Machinery parts and their functions are identified according to manufacturer's catalogue 1.5 ***Machine operating parameters*** are identified according to manufacturer's catalogue 1.6 Auxiliary machines are identified according to manufacturer's catalogue 1.7 Machine parts are lubricated and maintained according to operation manual
2 Adjust textile processing machine parts	2.1 Machinery safety is observed according to OSH act 2.2 ***Machinery parts*** affecting quality are identified according to manufacturer's catalogue 2.3 Condition of different parts of machine are inspected according to manufacturer's catalogue

	2.4 Machine settings are inspected according to manufacturer's catalogue 2.5 Machine settings are changed according to manufacturer's catalogue
3 Repair textile processing machine	3.1 Machinery safety is observed according to OSH act 3.2 ***Textile processing machine*** is disassembled according to operation procedures and manufacturer's catalogue 3.3 Textile processing machine parts are examined for defects according to manufacturer's catalogue 3.4 Machine parts are cleaned and lubricated according manufacturer's catalogue 3.5 Broken or malfunctioning components are repaired/replaced according to manufacturer's catalogue 3.6 Textile processing machine is reassembled according to manufacturer's catalogue 3.7 Manufacturer's manual is studied to determined correct installation according to manufacturer's catalogue 3.8 Newly reassembled textile processing machine is restarted and operated according to operation procedure and manufacturer's catalogue 3.9 Test results are recorded and analysed according to organisation procedure and manufacturer's catalogue 3.10 Inventory of parts used is stored according to organisational procedures
4 Document maintenance operation	4.1 Documentation tools are obtained according to organisational procedures 4.2 Machine maintenance is documented according to organisational procedures 4.3 Report is generated according to organizational procedures

RANGE

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

Variable	Range
1. Machine operating parameters may include but is not limited to:	• Pressure gauges • Fabric tension • Roller gauges
2. Machinery parts may include but is not limited to:	• Cams • Rollers • Guides • Wheels
3. Textile processing machine may include but is not limited to:	• Pre-treatment machines • Dyeing machines • Printing machines • Textile finishing machines

REQUIRED KNOWLEDGE

The individual needs to demonstrate knowledge of:

- Machine maintenance
- Pre-treatment machines
- Dyeing machines
- Printing machines
- Textile finishing machines
- Safety
- Documentation
- Mathematics understanding
- Physics
- Textile reference standards

REQUIRED SKILLS

The individual needs to demonstrate skills in:

- Carry out maintenance
- Pre-treatment machines operation
- Dyeing machines operation
- Printing machines operation
- Textile finishing machines operation
- Manage work efficiently
- Time management

- Troubleshooting
- House keeping
- Effective communication
- Application of safety procedures
- Energy conservation
- Good decision making
- Time management
- Report writing
- Record keeping

EVIDENCE GUIDE

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

1. Critical Aspects of Competency.	1.1 Maintained textile processing machine 1.2 Adjusted textile processing machine parts 1.3 Repaired textile processing machine 1.4 Documented maintenance operation
2. Resource Implications.	2.1 Oil 2.2 Grease 2.3 Lubricants 2.4 Cutter 2.5 Knotter 2.6 Nipper 2.7 Comb 2.8 Pick counting glass 2.9 Trolley 2.10 Scouring machine 2.11 Desizing machine 2.12 Mercerizing machines 2.13 Washing machines 2.14 Bleaching machines 2.15 Mechanical finishing machine 2.16 Chemical finishing machine 2.17 Singeing machine 2.18 Dyeing machine 2.19 Printing machine 2.20 Stationeries 2.21 Overhead projector/ Black or white board 2.22 Computer and its accessories
3. Methods of Assessment.	***Competency may be assessed through:*** 3.1 Practical 3.2 Observation 3.3 Questionnaire

	3.4 Case studies 3.5 Written examinations 3.6 Oral presentation
4. Context of Assessment.	Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions or during industrial attachment.
5. Guidance information for assessment.	This unit may be assessed on an integrated basis with others within this occupational sector.