

**REPUBLIC OF KENYA**

**OCCUPATIONAL STANDARDS**

**FOR**

**DAIRY PLANT TECHNICIAN**

**LEVEL 6**

**PROGRAMME CODE: 0721 554A**

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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 and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training (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 this curriculum has been developed.

It is my conviction that this Occupational Standards will play a great role towards development of competent human resource for sustainable development.

**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. 14 of 2012 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by the industry as well as increase the global competitiveness of the Kenyan labour force.

The National Polytechnics, in conjunction with the industry experts through the Industry Advisory Board (IAB), sector regulator boards, TVETA authority, and qualification awarding institution has developed these Occupational Standards for Dairy Plant Technician Level 5. The occupational standards will be the basis for the development of a competency-based education and training curriculum for Animal Dairy Plant Technician Level 5.

I am grateful to the Governing Council Members, TVETA, sector regulators, the industry experts, and subject experts who participated in the development of these standards.

**ACKNOWLEDGMENT**

These Occupational Standards were developed through the 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 input towards the development of these Occupational Standards.

I also thank all the individuals and organizations who participated in the validation of these Occupational Standards.

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**ABBREVIATIONS AND ACRONYMS**

|  |  |
| --- | --- |
| AI | Artificial Intelligent |
| CBET | Competence Based Curriculum Training |
| CEO | Chief Executive Officer |
| EAS | East Africa Standard |
| GAP | Good Agricultural Practices |
| ISO | Organization of International Standards |
| KCSE | Kenya Certificate of Secondary Education |
| KS | Kenya Standard |
| PPES | Personal Protective Equipment |
| SSAC | Sector Skill Advisory Committee |
| TVETA | Technical Vocational Education and Training Authority |

# OCCUPATIONAL STANDARD OVERVIEW

Dairy plant technician Level 5 consists of competencies that an individual must achieve to carry out activities in processing milk and milk products. It entails handling raw milk, processing fluid, fermented, and fat-based milk products; processing cheese products and conducting dairy product quality control.

This qualification consists of the following basic, common and core competencies:

**SUMMARY OF UNITS OF COMPETENCY**

1. **BASIC UNITS OF COMPETENCY**

|  |  |
| --- | --- |
| **ISCED UNIT CODE** | **UNIT TITLE** |
| 0031 441 01A | Apply Communication Skills |
| 0413 441 02A | Apply Entrepreneurial Skills |
| 0031 441 03A | Apply Work Ethics and Practices |
| 0611 451 04A | Apply Digital Literacy |

1. **COMMON UNIT OF COMPETENCY**

|  |  |
| --- | --- |
| **ISCED UNIT CODE** | **UNIT TITLE** |
| 0721 541 05A | Apply Dairy Equipment Operational Principles |
| 0721 541 06A | Apply Principles of Dairy Plant Utilities |
| 0811 551 07A | Apply Agricultural Marketing Principles |
| 0811 551 08A | Apply Dairy Production Principles |
| 0721 551 09A | Apply Dairy Chemistry Principles |
| 0811 511 10A | Apply Scientific Research Principles |
| 0721 551 11A | Apply Dairy Microbiology Principles |

1. **CORE UNITS OF COMPETENCY**

|  |  |
| --- | --- |
| **ISCED UNIT CODE** | **UNIT TITLE** |
| 0721 551 12A | Handle Raw Milk |
| 0721 551 13A | Process Fluid Milk Products |
| 0721 551 14A | Process Fermented Milk Products |
| 0721 551 15A | Process Cheese Products |
| 0721 551 16A | Process Fat Based Milk Products |
| 0721 551 17A | Process Concentrated and Dried Milk Products |
| 0721 451 18A | Conduct Dairy Product Quality Control |
| 0721 551 19A | Conduct Dairy Product Quality Assurance |

# 

# BASIC UNITS OF COMPETENCY

## APPLY DIGITAL LITERACY

**ISCED UNIT CODE: 0031 441 1A**

**UNIT DESCRIPTION:**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to apply digital literacy. It involves operating computer devices, solving tasks using the Office suite, accessing online/offline data and information, performing online communication and collaboration, applying cybersecurity skills and performing jobs online. It also involves applying job entry techniques.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the key outcomes that make up workplace functions | **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. Operate computer devices | * 1. C***omputer device*** usage is determined as per workplace requirements.   2. ***Computer hardware*** is identified according to job requirements.   3. ***Computer software*** is identified according to workplace requirements.   4. Computer devices are turned on or off as per the correct workplace procedure.   5. ***Mouse techniques*** are applied in solving tasks as per workplace requirements.   6. Keyboardtechniques are applied in solving tasks as per workplace requirements.   7. Computer files and folders are created and managed as per workplace requirements.   8. ***Internet connection option***s are identified and applied in connecting computer devices to the Internet.   9. ***External devices*** are identified and connected to the computer devices as per the job requirement. |
| 1. Solve tasks using Office suite | 1. ***Word processing concepts***are applied in solving workplace tasks as per job requirements. 2. Worksheet data is entered and prepared in accordance with work procedures. 3. Worksheet data is built and edited in accordance with workplace procedures. 4. ***Data manipulation*** on a worksheet is undertaken in accordance with work requirements. 5. Worksheets are saved and printed in accordance with job requirements. 6. ***Electronic presentation concepts***are applied in solving workplace tasks as per job requirements. |
| 1. Manage data and information | * 1. Office ***internet services*** are identified and applied in accordance with office procedures.   2. ***Internet access applications*** are determined in accordance with office operation procedures.   3. Internet search is performed as per job requirements.   4. Online digital content is downloaded in accordance with workplace requirements.   5. Digital content is identified and backed up in accordance with workplace procedures. |
| 1. Perform online communication and collaboration | * 1. Netiquette principles are observed as per work requirements.   2. Electronic mail communication is executed in accordance with workplace policy.   3. Digital content copyright and licenses are identified and applied according to workplace policies and regulatory requirements.   4. ***Online*** ***collaboration tools*** are applied in accordance with workplace policies and regulatory requirements. |
| 1. Apply cybersecurity skills | * 1. ***Data protection*** and ***privacy*** is classified in accordance with workplace policies and regulatory requirements.   2. ***Internet security threats*** are identified as per workplace policies and regulatory requirements.   3. Computer threats and crimes are detected in accordance to Information Management security guidelines   4. ***Cybersecurity control measures*** are applied in accordance with workplace policies and regulatory requirements. |
| 1. Perform online jobs | * 1. ***Online job platforms*** are identified as per the job requirements.   2. Online accounts and profiles are created in accordance with the work requirements.   3. Online jobs are identified according to the bidder’s skillset.   4. Online digital identity is managed according to industry best practices.   5. Online job bidding is done as per the specific job requirements.   6. Online tasks are executed according to the job requirements.   7. Personal online payment account is managed in accordance with financial regulations. |
| 1. Apply job entry techniques | * 1. ***Job opportunities*** are sought based on competencies.   2. A winning resume/Curriculum Vitae (CV) is developed as per job advertisement.   3. An application/cover letter is developed based on the job advertisement.   4. ***certificates and testimonials*** are organized as per resume.   5. ***Interview skills*** are demonstrated as per job advertisement. |

**RANGE**

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

| **Variable** | **Range** |
| --- | --- |
| 1. Computer devices may include but are not limited to: | * Desktops * Laptops * Smartphones * Tablets * Smartwatches |
| 1. Computer hardware may include but are not limited to: | * The System Unit E.g. Motherboard, CPU, casing, * Input Devices e.g. Pointing, keying, scanning, voice/speech recognition, direct data capture devices. * Output Devices e.g. hardcopy output and softcopy output * Storage Devices e.g. main memory e.g. RAM, secondary storage (Solid state devices, Hard Drives, CDs & DVDs, Memory cards, Flash drives * Computer Ports e.g. HDMI, DVI, VGA, USB type C etc. |
| 1. Computer software may include but are not limited to: | * System software e.g. Operating System (Windows, Macintosh, Linux, Android, iOS) * Application Software e.g. Word Processors, Spreadsheets, Presentations etc. * Utility Software e.g. Antivirus programs |
| 1. External devices may include but are not limited to: | * Printers * Projectors * Smart Boards * Speakers * External storage drives * Digital/Smart TVs |
| 1. Word processing concepts may include but are not limited to: | * Creating word documents * Editing word documents * Formatting word documents * Saving word documents * Printing word documents |
| 1. Mouse techniques may include but are not limited to: | * Clicking * Double-clicking * Right-clicking * Drag and drop |
| 1. Internet connection options may include but are not limited to: | * Mobile Networks/Data Plans * Wireless Hotspots * Cabled (Ethernet/Fiber) * Dial-Up * Satellite * ISDN (Integrated Services Digital Network) |
| 1. Data manipulation may include but are not limited to: | * Use of formulae * Use of functions * Sorting * Filtering * Visual representation using charts |
| 1. Electronic presentation concepts may include but are not limited to: | * Creating slides * Editing slides * Formatting slides * Applying slide effects and transitions * Creating and playing slideshows * Saving presentations * Printing slides and handouts |
| 1. Internet services may include but are not limited to: | * Communication Services * Information Retrieval Services * File Transfer * World Wide Web Services * Web Services * Directory Services * Automatic Network Address Configuration * Newsgroup * Ecommerce |
| 1. Internet access applications/software may include but are not limited to: | * Browsers * Email Apps * eCommerce Apps |
| 1. Online collaboration tools may include but are not limited to: | * Online Storage * Online productivity applications * Online meetings, * Online learning environments, * Online calendars * Social networks |
| 1. Data protection and privacy may include but not limited to: | * Confidentiality of data/information * Integrity of data/information * Availability of data/information |
| 1. Internet security threats may include but not limited to: | * Malware attacks * Social engineering attacks * Software supply chain attacks * Advanced persistent threats (APT) * Distributed denial of service (DDoS) * Man-in-the-middle attack (MitM) * Password attacks * IoT Attacks * [Phishing Attacks](https://onlinedegrees.sandiego.edu/top-cyber-security-threats/#phishing-attacks) * [Ransomware](https://onlinedegrees.sandiego.edu/top-cyber-security-threats/#ransomware) |
| 1. Security threats control measures may include but not limited to: | * Counter measures against cyber terrorism * Physical Controls * Technical/Logical Controls * Operational Controls |
| 1. Online job platforms may include but are not limited to: | * Remo task * Data annotation.tech * Cloud worker * Upwork * Oneforma * Appen |
| 1. Job opportunities may include but not limited to: | * Self-employment * Service provision * product development * salaried employment |
| 1. Certificates and testimonialsmay include but not limited to: | * Academic credentials * Letters of previous employments/ services rendered * Letters of commendation * Certifications of participation * Awards |
| 1. Interview skills may include but not limited to: | * Listening skills * Grooming * Language command * Articulation of issues * Body language * Time management * Honesty * Generally knowledgeable in current affairs and technical area |

**REQUIRED KNOWLEDGE AND SKILLS**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Computer Hardware and Software Concepts
* Computer Security Concepts (Data security and privacy)
* Cyber security threats and control measures
* Understanding Computer Crimes
* Detection and protection against computer crimes
* Laws governing protection of Information and Communication Technology (ICT) in Kenya
* Digital Identity Management
* Netiquette Principles
* Fundamentals of Copyright and Licenses
* Word processing;
* Functions and concepts of word processing;
* Documents and tables creation and manipulations;
* Document editing;
* Document formatting;
* Word processing utilities
* Spreadsheets;
* Meaning, types and importance of spreadsheets;
* Components of spreadsheets;
* Functions, formulae, and charts, uses and layout;
* Data formulation, manipulation and application to cells;
* Editing & formatting spreadsheets;
* Presentation Packages;
* Types of presentation Packages.
* Creating, formulating, running, editing, printing and presenting slides and handouts
* Networking and Internet;
* Internet connectivity.
* Browser and digital content management;
* Managing data, information, and digital content
* Electronic mail and World Wide Web
* Fundamentals of Online Working;
* Online Profile Management;
* e-Portfolio Management;
* Online Jobs Bidding;
* Online Payment Systems;
* Job entry techniques
* Job searching sites
* Interview preparation skills
* Interview handling

**Required skills**

The individual needs to demonstrate the following skills:

* Active listening
* Keyboard Skills
* Mouse Skills
* Analytical skills
* Creativity
* Interpretation Skills
* Communication
* Spreadsheet operations (applying fundamental operations such as addition, subtraction, division and multiplication)
* Computer Use Safety Skills
* Document Editing Skills
* Document Formatting Skills
* Document Printing Skills
* Netiquette Skills
* Internet Browsing Skills
* Problem Solving Skills
* Online Collaboration Skills
* Cybersecurity Skills
* CV writing
* grooming

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | ***Assessment requires evidence that the candidate:***   * 1. Operated computer devices as per workplace policies and regulations.   2. Solved tasks using the office suite as per workplace policies and regulations.   3. Manage data and information as per workplace policies and regulations.   4. Performed online communication and collaboration as per workplace policies and regulations.   5. Applied cybersecurity skills in accordance with workplace policies and regulations.   6. Executed online tasks according to the job requirements.   7. Searched for job opportunity based on competencies.   8. Prepared job requirement documentations based on job opportunity.   9. Demonstrated interview skills based on the job opportunity. |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place.   2. Access to relevant work environments where assessment can take place.   3. Resources relevant to the proposed activities or task. |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Observation   2. Oral assessment   3. Portfolio of evidence   4. Interviews   5. Third party report   6. Written assessment   7. Practical assessment   8. Projects |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## APPLY COMMUNICATION SKILLS

**ISCED UNIT CODE: 0413 441 2C**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to apply communication skills. It involves applying communication channels, written, non-verbal, oral and group communication skills.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the key outcomes that 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. Apply communication channels | 1. Specific communication channels are identified and applied based on workplace requirements. 2. Challenges are identified and addressed as per the operational standards of the organization. 3. Communication channels are evaluated to meet workplace needs. |
| 1. Apply written communication skills | * 1. Types of written communication are identified and applied according to the workplace requirements.   2. Written communication needs are identified and implemented according to workplace procedures.   3. Written communication guidelines are analyzed, evaluated, and revised based on workplace needs. |
| 1. Apply non-verbal communication skills | 3.1 Existing non-verbal communication techniques are identified and applied based on organization policy.  3.2 Non-verbal communication techniques are articulated and modeled to enhance inclusivity according to workplace requirements. |
| 1. Apply oral communication skills | 4.1 Types of oral communication are identified and established as per organization policy.  4.2 Pathways of oral communication are identified and established as per organization policy.  4.3 Pathways of oral communication are reviewed according to organization procedures.  4.4 Pathways of oral communication are maintained according to the organization standards. |
| 1. Apply group communication skills | 1. Group communication strategies are appliedbased on the workplace needs. 2. Groups are organized in accordance with workplace procedures. 3. Effective questioning, listening and non-verbal communication techniques are used as per needs.   5.4 Group communication challenges are identified and addressed according to the workplace needs. |

**RANGE**

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

| **Variable** | **Range** |
| --- | --- |
| 1. Communication strategies may include but are not limited to: | * Language switch * Comprehension check * Repetition * Asking confirmation * Paraphrasing * Clarification request * Translation * Restructuring * Generalization |
| 1. 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 |
| 1. Situations may include but are not limited to: | * Establishing rapport * Eliciting facts and information * Facilitating resolution of issues * Developing action plans |

**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
* Interpretation
* Negotiation
* Writing
* Oral skills
* Creative thinking
* Critical thinking
* Decision making
* Analytical
* Innovation
* Conflict skills
* Leadership
* Problem solving skills
* Management
* Organizational
* Teamwork

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Communication process
* Dynamics of groups
* Styles of group leadership
* Key elements of communications strategy
* Principles of effective communication
* Turn-taking techniques
* Conflict resolution techniques
* Work planning
* Work organization
* Company policies
* Company operations and procedure standards
* Fundamental rights at the workplace
* Personal hygiene
* Accountability
* Workplace problems and how to deal with them

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of Competency. | Assessment requires evidence that the candidate:   * 1. Identified and applied specific communication channels based on workplace requirements.   2. Identified and applied specific written communication correspondence according to the workplace requirements.   3. Applied and developed non-verbal strategies to communicate in all areas of the workplace requirements.   4. Established pathways of oral communication as per workplace policy.   5. Applied group communication strategies based on workplace needs. |
| 1. Resource Implications | The following resources should be provided:   1. Access to relevant workplace where assessment can take place. 2. Appropriately simulated environment where assessment can take place. 3. Resources relevant to the proposed activity or tasks. |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   * 1. Observation   2. Oral assessment   3. Portfolio of evidence   4. Interviews   5. Third party report   6. Written assessment   7. Practical assessment   8. Projects |
| 1. Context of Assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## APPLY WORK ETHICS AND PRACTICES

**ISCED UNIT CODE: 0031 441 3C**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to apply work ethics and practices. It involves applying self-management skills, promoting ethical work practices and values, promoting teamwork, maintaining professional and personal development, applying problem solving skills and promoting customer care.

**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 Range*** |
| --- | --- |
| 1. Apply self-management skills | 1. Personal vision, mission and goals are formulated based on potential and concerning organization objectives and strategic plan 2. Self-esteem and a positive self-image are developed and maintained based on value 3. Emotional intelligence and stress management are demonstrated as per workplace requirements. 4. Assertiveness is developed and maintained based on the requirements of the job. 5. Accountability and responsibility for one's actions are demonstrated based on workplace instructions. 6. Time management, attendance and punctuality are observed as per the organization’s policy. 7. Personal goals are managed as per the organization’s objective 8. Self-strengths and weaknesses are identified based on personal objectives 9. Motivation, initiative and proactivity are utilized as per the organization policy 10. Individual performance is evaluated and monitored according to the agreed targets. |
| 1. Promote ethical work practices and values | 1. Integrity is demonstrated as per acceptable norms 2. Codes of conduct is applied as per the workplace requirements 3. Policies and guidelines are observed as per the workplace requirements 4. Professionalism is exercised in line with organizational policies |
| 1. Promote Team work | 3.1 ***Teams*** are formed to enhance productivity based on organization’s objectives  3.2 Duties are assigned to teams under the organization policy.  3.3 Team activities are managed and coordinated as per set objectives.  3.4 Team performance is evaluated based on set targets as per workplace policy.  3.5 ***Conflicts*** are resolved between team members in line with organization policy.  3.6 Gender and diversity-related issues are identified and mainstreamed in accordance with workplace policy.  3.7 Healthy ***relationships*** are developed and maintained in line with the workplace.  3.8 Adaptability and flexibility are applied in dealing with team members as per workplace policies |
| 1. Maintain professional and personal development | 4.1 ***Personal growth and development*** needs are identified and assessed in line with the requirements of the job.  ***4.2 Training and career opportunities*** are identified and utilized based on job requirements.  4.3 ***Resources*** for training are mobilized and allocated based on organizations and individual skills needs.  4.4 Licenses and certifications relevant to the job and career are obtained and renewed as per policy.  4.5 Recognitions are sought as proof of career advancement in line with professional requirements.  4.6 Work priorities and personal commitments are balanced and managed based on the requirements of the job and personal objectives.  4.7 Dynamism and on-the-job learning are embraced in line with the organization’s goals and objectives. |
| 1. Apply Problem solving skills | 5.1 ***Creative, innovative*** and practical solutions are developed based on the problem  5.2 Independence and initiative in identifying and solving problems are demonstrated based on the requirements of the job.  5.3 Team problems are solved as per the workplace guidelines  5.4 Problem-solving strategies are applied as per the workplace guidelines  5.5 Problems are analyzed and assumptions tested as per the context of data and circumstances |
| 1. Promote Customer Care | 1. Customers' needs are identified based on their characteristics 2. Customer ***feedback*** is allowed and facilitated in line with organization policies. 3. Customer concerns and complaints are analyzed and resolved in line with the set organizational culture. 4. Proactive customer outreach programs are implemented as per organizational policies 5. Customer retention strategies are developed and implemented in line with the organizational policy |

**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. Feedback may include but are not limited to: | * Verbal * Written * Informal * Formal |
| 1. Conflicts include but are not limited to: | * Interpersonal Conflict. * Intrapersonal Conflict. * Intergroup Conflict. * Intragroup Conflict. |
| 1. Relationships may include but are not limited to: | * Man/Woman * Trainer/trainee * Employee/employer * Client/service provider * Husband/wife * Boy/girl * Parent/child * Sibling relationships |
| 1. Team may include but are not limited to: | * Small work group * Staff in a section/department * Inter-agency group * Virtual teams |
| 1. Personal growth may include but are 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 |
| 1. Personal objectives may include but are not limited to: | * Long term * Short term * Broad * Specific |
| 1. Trainings and career opportunities may include but are not limited to | * Participation in training programs * Serving as Resource Persons in conferences and workshops * Capacity building |
| 1. Resource may include may but are not limited to: | * Human * Financial * Technology |
| 1. Creative and innovative may include but are not limited to: | * New ideas * Original ideas * Different ideas * Methods/procedures * Processes * New tools |
| 1. Emerging issues may include but are not limited to: | * Artificial Intelligence * Data confidentiality * National cohesion * Open offices |

**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
* Critical thinking
* Organizational
* Negotiation
* Monitoring
* Evaluation
* Problem solving
* Decision Making
* Leadership
* Creative/innovative thinking
* Adaptability
* Conflict management
* Emotional intelligence
* Teamwork

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Work values and ethics
* Company policies and procedures
* Company operations, procedures and standards
* Flexibility and adaptability
* Concept of time and leisure time
* Decision making
* Work planning
* Organizing work
* Monitoring and evaluation
* Record keeping
* Gender and diversity mainstreaming
* Drug and substance abuse
* Professional growth and development
* creativity
* Innovation
* problem solving
* customer care
* Mentoring and coaching.
* Emerging issues

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of Competency | Assessment require evidence that the candidate:   * 1. Applied self-management skills as per organizational procedures.   2. Promoted ethical practices and values as per organizational procedures.   3. Promoted Teamwork as per workplace assignments.   4. Maintained professional and personal development as per organizational procedures.   5. Applied Problem-solving skills based on work requirements.   6. Identified customer needs based on their characteristics.   7. Gave back Customer feedback in line with organization policies. |
| 1. Resource Implications | The following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place. 3. Resources relevant to the proposed activity or tasks. |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Portfolio of Evidence 5. Interview 6. Third party report |
| 1. Context of Assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## APPLY ENTREPRENEURIAL SKILLS

**ISCED UNIT CODE: 0611 451 4A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to apply entrepreneurial skills. It involves applying financial literacy, entrepreneurial, business legal aspects concepts; identifying entrepreneurship opportunities; developing business innovative strategies, and business plans.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the key outcomes that 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 Range*** |
| --- | --- |
| 1. Apply Financial Literacy Skills | 1. **Sources of personal and business** ***funds*** are identified as per financial procedures and standards 2. Personal finances are managed as per financial procedures and standards 3. Savings are managed as per financial procedures and standards 4. Debts are managed as per financial procedures and standards 5. Investments are undertaken as per financial procedures and standards 6. Insurance services are procured as per financial procedures and standards |
| 1. Apply entrepreneurial concept | 1. Entrepreneurs and Business persons are distinguished as per principles of entrepreneurship 2. ***Types of entrepreneurs*** are identified as per principles of entrepreneurship 3. Ways of becoming an entrepreneur are identified as per principles of Entrepreneurship 4. ***Characteristics of Entrepreneurs*** are identified as per principles of Entrepreneurship 5. Salaried employment and self-employment are distinguished as per principles of entrepreneurship 6. ***Requirements for entry into self-employment*** are identified according to business procedures and standards 7. Roles of an Entrepreneur in an enterprise are determined according to business procedures and standards 8. **Contributions of entrepreneurship** to National development are identified as per business procedures and standards |
| 1. Identify entrepreneurial opportunities | 1. Business ideas are identified as per business procedures and standards 2. Factors to consider when evaluating business opportunity viability are explored based on business procedure and standards 3. Entrepreneurial opportunities are evaluated as per business procedures and standards 4. Business ideas and opportunities are generated as per business procedures and standards 5. Business life cycle is analysed as per business procedures and standards |
| 1. Apply business legal aspects | 1. ***Forms of business ownership*** are identified as per legal procedures and practices 2. Business Registration and Licensing processes are identified as per legal procedures and practices 3. Types of Contracts and Agreements are analysed as per legal procedures and practices 4. Employment Laws are identified as per legal procedures and practices 5. Taxation laws are identified as per legal procedures and practices |
| 1. Develop innovate Business strategies | 1. Business innovation strategies are determined by the organization standards 2. Creativity in business development is demonstrated in accordance with business standards 3. ***Innovative business standards***  are developed as per business principles 4. Linkages with other entrepreneurs are created as per best practice 5. ICT is incorporated in business growth and development as per best practice |
| 1. Develop Business Plan | 1. Business idea is described as per business procedures and standards 2. Business description is developed as per business plan format 3. Marketing plan is developed as per business plan format 4. Organizational/Management plan is prepared in accordance with business plan format 5. Production/operation plan is prepared in accordance with business plan format 6. Financial plan is prepared in accordance with the business plan format 7. Executive summary is prepared in accordance with business plan format 8. Business plan is presented as per best practice 9. Business ideas are incubated as per institutional policy. |

**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. Sources of personal funds mayinclude but are not limited to: | * Salary/Wages * Investments * Savings * Inheritance * Government Benefits |
| 1. Sources of business finance mayinclude but are not limited to: | * Equity Financing * Debt Financing, * Personal Savings/Investment * Retained Earnings * Grants and Subsidies * Crowdfunding * supplier Credit: * Leasing and Asset Financing: |
| 1. Types of entrepreneurs may include but are not limited to: | * Innovators * Imitators * Craft * Opportunistic * Speculators |
| 1. Characteristics of Entrepreneurs may include but are not limited to: | * Creative * Innovative * Planner * Risk taker * Networker * Confident * Flexible * Persistent * Patient * Independent * Future oriented * Goal oriented |
| 1. Requirements for entry into self-employment may include but are not limited to | * Technical skills * Management skills * Entrepreneurial skills * Resources * Infrastructure |
| 1. Forms of businesses ownership may include but are not limited to: | * Sole proprietorship * Partnership * Limited companies * Cooperatives |
| 1. Innovative business standards may include but are 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 standards
* 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 standards
* Market and feasibility studies
* Government and regulatory processes
* Local and international business environment
* Relevant developments in other industries
* Regional/ County business expansion standards

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Identified Sources of personal and business finance as per financial procedures and standards 2. Managed Personal finances as per financial procedures and standards 3. Made Investment decisions as per financial procedures and standards 4. GeneratedBusiness ideas and opportunities based on business procedure and standards 5. Analysed business life cycle based on business procedure and standards 6. Determined business innovative standards as per business principles 7. Developed and presented a business plan as per regulatory framework. |
| 1. Resource Implications | The following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place |
| 1. Methods of Assessment | Competency may be assessed through:   1. Written tests 2. Oral questions 3. Third party report 4. Interviews 5. Portfolio |
| 1. Context of Assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# COMMON UNITS OF COMPETENCY

**APPLY FUNDAMENTALS OF DAIRY TECHNOLOGY**

**UNIT CODE: 0721 441 05A  
UNIT DESCRIPTION:**This unit specifies the competencies required by Dairy Processing Attendant level 4 to apply  
fundamentals of dairy technology. It involves application milk composition and dairy  
microbiology knowledge and dairy equipment operations principles.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace functions | **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 milk composition knowledge | 1.1 ***Milk constituents*** are tested as per dairy processing manual 1.2 ***Milk physical properties*** are applied as per work instructional manual 1.3 ***Milk chemical properties*** are applied as per work instruction manual |
| 2. Apply dairy microbiology knowledge | 2.1 Microbiological principles are applied in dairy processing as per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products. 2.2 ***Microbiology test apparatus*** are used as per good laboratory practices. 2.3 Dairy microbial specimens are collected as per good laboratory practices. 2.4 Microbial findings are documented as per work instruction manual. 2.5 Microbial wastes are managed as per KS 1552: 2016 Code of hygienic practice for milk and milk products. 2.6 Microbiology apparatus is cleaned and maintained as per good laboratory practices. |
| 1. Apply dairy equipment operational principles | 31 ***Dairy equipment and machinery*** are assembled as per work.  requirement 3.2 Dairy equipment and machinery are operated as per equipment and machinery operation manual 3.16 ***Dairy utilities*** are utilized as per work requirement. |

**RANGE**

|  |  |
| --- | --- |
| **RANGE** | **VARIABLE** |
| ***Milk constituents*** may include but not limited to: | • Carbohydrates • Proteins • Vitamins • Minerals • Butterfat • Water |
| ***Milk physical properties*** may include but not limited to: | • Colour • Taste • Density • Viscosity • Freezing point • Ph • Enzymes • Emulsions • Heat sensitivity. |
| ***Milk chemical properties*** may include but not limited to: |  |
| ***Microbiology test apparatus*** may include but not limited to: | • Microscope • Incubators • Autoclaves • Heat exchanger • Vats • Tanks • Cans • pumps • Steam system • water |
| ***Dairy equipment and machinery*** may include but not limited to: |  |
| ***Dairy utilities*** may include but not limited to: | • Waste water system • Refrigeration. • Pneumatic system. |

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

**Required knowledge**The individual needs to demonstrate knowledge of:

* Milk composition.
* Microorganisms
* Microscopy procedures
* Processing Techniques
* Quality Control measures
* Packaging and Storage
* Hygiene

**Required Skills**The individual needs to demonstrate the following skills:

* Communication.
* Testing skills.
* Time management.
* Data collection.
* Numeracy.
* Observation.
* Digital literacy

**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 Tested Milk constituents as per dairy processing manual   * 1. Applied Microbiological principles in dairy processing as per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products.   2. Operated dairy equipment and machinery as per equipment and machinery operation manual   3. Utilized dairy utilities as per work requirement. |
| * + - 1. Resource implication | 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 2.3 Materials relevant to the proposed assessment activity or tasks |
| * + - 1. Method of assessment | Competency in this unit may be assessed through:   * Practical * Oral questioning * Portfolio of evidence * Third party report * Written tests |
| * + - 1. Context of assessment | 4.1 Competency elements must be assessed in a safe working environment 4.2 Assessment may be conducted in a workplace or simulated environment |
| * + - 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended |

## APPLY DAIRY EQUIPMENT OPERATIONAL PRINCIPLES

**ISCED UNIT CODE: 0721 551 06A**

**Unit Description**

This unit specifies the competencies required by a Dairy Processing technician Level 6 to apply Dairy equipment operational Principles. It involves applying unit operations principles, applying operations and maintenance principles and applying instrumentation and automation principles in in dairy processing.

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**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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 unit operations principles | 1. Dimensions and units are used based on work requirement 2. Unit operations are identified as per work requirements    1. Unit operations are applied as per work requirements |
| 1. Apply dairy plant layout principles | 1. Equipment layout is selected based on work requirements. 2. Dairy plant layout is designed based on work requirements 3. Dairy equipment are arranged based on work requirements. |
| 1. Apply dairy plant design principles | 1. Construction materials are selected based on code hygiene practices. 2. Dairy plant is constructed in accordance with work requirements 3. Constructed dairy plant is evaluated as per design requirement. |
| 1. Apply Dairy Machinery and Equipment operation principles | 1. Processing equipment and machinery are selected as per work requirement 2. Processing equipment and machinery assembled as per manufacturer’s instruction manual 3. Processing equipment and machinery are operated as per manufacturer’s instructions manual. 4. Processing equipment and machinery records are updated as per work requirements |
| 1. Apply Dairy Machinery and Equipment Maintenance principles | 1. Processing equipment and machinery maintenance requirements are established based on manufacture’s instructions. 2. Processing equipment and machinery maintenance procedures are applied as per manufacturer’s instructions 3. Processing equipment and machinery maintenance records are updated as per work instructions. |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Unit operations
* Dairy plant layout
* Dairy plant design
* Dairy Machinery and Equipment operation

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication.
* Dairy Machinery and Equipment operation
* Time management.
* Numeracy.
* Observation.
* Digital literacy.

**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. Selected equipment layout based on work requirements. 2. Designed dairy plant layout based on work requirements 3. Arranged dairy equipment based on work requirements. 4. Assembled processing equipment and machinery as per manufacturer’s instruction manual 5. Operated processing equipment and machinery as per manufacturer’s instructions manual. 6. Maintained processing equipment and machinery based on manufacturer’s instructions 7. . Updated processing equipment and machinery records as per work requirements |
| 1. Resource   implication | The following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed assessment activity or tasks |
| 1. Method of   assessment | Competency in this unit may be assessed through:   * 1. Practical assessment   2. Oral questioning   3. Written tests |
| 1. Context of   assessment | 4.1 Competency elements must be assessed in a safe working environment  4.2 Assessment may be conducted in a workplace or simulated environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## APPLY PRINCIPLES OF DAIRY PLANT UTILITIES

**ISCED UNIT CODE**: **0715 551 07A**

**Unit Description**

This unit specifies the competencies required by a Dairy Plant Technologist level 6 to apply Dairy Plant Utilities Principle. It involves applying unit operations principles, steam generation, refrigeration, pneumatic, waste management and water management principles.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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 steam generation principles | 1. Steam is generated in accordance with steam boiler operation manual. 2. Steam is distributed as per work requirement 3. Steam is utilised as per work requirement 4. Steam generation system is maintained as per steam boiler operation manual. 5. Steam generation system records are updated as per work requirement. |
| 1. Apply refrigeration principles | 1. Refrigeration system is operated as per manufacturer’s instructions. 2. Refrigeration system is maintained as per steam boiler operation manual 3. Chilled water is conveyed as per operation guidelines. 4. Refrigeration records are updated as per work requirement. |
| 1. Apply pneumatic principles | 1. Compressed air is generated as per work requirement 2. Compressed air is conveyed as per safety guidelines. 3. Compressed air is utilized as per work requirement 4. Vacuum is generated as per work requirement. 5. Vacuum is utilized in Machine/ equipment actuation. 6. Pneumatic system records are updated as per work instructions. |
| 1. Apply waste management principles | 1. Dairy waste is segregated as per NEMA guidelines. 2. Dairy waste is treated as per NEMA guidelines 3. Treated dairy waste is analysed as per NEMA guidelines. |
| 1. Apply water management principles | 1. Water sources are identified as per work requirements 2. Water quality is analysed as per Water Regulatory Authority 3. Water is utilized as per work requirements |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* principles of steam generation
* Principles of refrigeration system
* Principles of pneumatic
* Waste management principles
* Dairy utilities operation

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication.
* Dairy utilities operation
* Time management.
* Numeracy.
* Observation.
* Digital literacy.

**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. Generated steam in accordance with steam boiler operation manual. 2. Distributed steam as per work requirement 3. Utilised steam as per work requirement 4. Maintained steam generation system as per steam boiler operation manual. 5. Operated refrigeration system as per manufacturer’s instructions. 6. Maintained refrigeration system as per steam boiler operation manual 7. Conveyed chilled water as per operation guidelines. 8. Generated compressed air as per work requirement 9. Conveyed compressed air as per safety guidelines. 10. Utilized Compressed air as per work requirement 11. Segregated dairy waste as per NEMA guidelines. |
| 1. Resource   implication | The following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed assessment activity or tasks |
| 1. Method of   assessment | Competency in this unit may be assessed through:   * 1. Practical assessment   2. Oral questioning   3. Written tests |
| 1. Context of   assessment | 4.1 Competency elements must be assessed in a safe working environment  4.2 Assessment may be conducted in a workplace or simulated environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## APPLY AGRICULTURAL MARKETING PRINCIPLES

**UNIT CODE: 0811 551 08A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technologist level 6 to Apply Agricultural Marketing Principles. It involves applying agricultural marketing concepts implementing marketing services, applying marketing mix concepts and identify market structures

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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 agricultural marketing concepts | * 1. Market share is determined as per work instruction manual   2. Brand awareness is evaluated as per work instruction manual   3. Customer satisfaction is measured as per work instruction manual   4. Sales performance is established as per work instruction manual**.**   5. ***Distribution channels*** are assessed as per work instruction manual   6. Competition activities data is analyzed as per work instruction manual**.**   7. ***Marketing costs*** are evaluated as per work instruction manual   8. Business sustainability is established as per work instruction manual |
| 1. Implement marketing services | 1. Market research is conducted as per work instruction.    1. Product price is established as per market dynamics    2. ***Market Access Services*** are implemented based on market needs    3. ***Quality Control Services*** are implemented based on markets needs    4. ***Packaging Services*** are carried out based on market needs.    5. Promotional campaigns are carried out based on work requirements    6. ***Risk Management Services*** are implemented as per marketing procedures. |
| 1. Apply marketing mix concepts | * 1. Agricultural product is developed market needs   2. Product price is determined market dynamics   3. Product distribution channels established laws of supply and demand.   4. Promotion activities are implemented based on work requirements |
| 1. Identify market structures | * 1. Market competition is determined based on market dynamic   2. Regulatory environment is determined as per legal guidelines for marketers   3. Market dynamics are established laws of supply and demand. |

**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. Distribution channels may include but not limited to: | * Direct sales * Retail * Wholesale * Distributors * E-commerce * Agent or Broke |
| 1. Marketing costs may include but not limited to: | * Advertising promotions * Digital Marketing * Content Creation * Marketing Research * Marketing Technology * Agency Fees and Outsourcing * Branding and Identity |
| 1. Market Access Services may include but not limited to: | * Market Research and Analysis * Market Entry Strategy Development * Regulatory Compliance and Market Access * Planning Market Access * Advocacy and Government Relations * Distribution and Channel Development |
| 1. Quality Control Services may include but not limited to: | * Quality planning * Quality assurance * Quality inspection and testing * Statistical process control * Root cause analysis * Documentation and reporting |
| 1. Packaging Services may include but not limited to: | * Packaging design * Material selection * Customization and branding * Prototyping and testing * Manufacturing and production * Supply chain management * Regulatory compliance |
| 1. Risk Management Services may include but not limited to: | * Risk identification * Risk assessment and analysis * Risk mitigation planning * Risk monitoring and control * Compliance and regulatory services: |

**REQUIRED KNOWLEDGE AND SKILLS**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Marketing concepts
* Marketing mix
* Marketing strategies
* Market structures
* Risk taking

**Required skills**

The individual needs to demonstrate the following skills:

* Observation
* Writing
* Active listening
* Marketing

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Determined market share as per work instruction manual   2. Measured customer satisfaction as per work instruction manual   3. Assessed distribution channels as per work instruction manual   4. Conducted market research as per work instruction.   5. Established product price as per market dynamics   6. Implemented quality control Services based on markets needs   7. Implemented risk management services as per marketing procedures.   8. Determined regulatory environment as per legal guidelines for marketers |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place 2. Access to relevant work environment 3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical assessment 2. Oral questioning 3. Portfolio of evidence 4. Third party report 5. Written tests |
| 1. Context of assessment | Competency may be assessed:   1. Workplace 2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## APPLY DAIRY PRODUCTION PRINCIPLES

**UNIT CODE: 0811 551 09A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technologist level 6 to apply dairy production principles. It involves breeding dairy cattle, applying principles of animal nutrition, applying hygienic milk production practices and performing dairy practices

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENTS AND PERFORMANCE CRITERIA** | **ELEMENTS AND PERFORMANCE CRITERIA** |
| 1. Apply breeding principles | 1. ***Dairy animal breeds*** are identified based on Livestock production manual (LPM) 2. Breeding management tools, equipment and materials are used in accordance with LPM 3. Dairy animal breeding is carried out based on LPM 4. Breeding records are prepared as per work procedures |
| 1. Apply dairy animal structures principles | 1. Tools, equipment and materials are assembled as per work requirements 2. Site of ***dairy animal structures*** is selected based on LPM 3. Dairy animal structures are designed according to Livestock Production Manual (LPM). 4. Dairy animal structures are constructed based on livestock production manual 5. Dairy animal structures are maintained as per work procedures 6. Maintenance records are kept as per work requirements 7. Waste is managed according to environmental protection regulations |
| 1. Apply animal nutrition principles | 1. ***Dairy animal feeds*** are identified as per the nutritional requirements 2. Feed formulation tools, equipment and materials are used based on feed formulation manual 3. ***Components of animal feed***rations are identified as per animal feeding standard 4. Dairy animal feed rations are formulated as per animal feeding standard 5. Dairy animal is fed as per animal feed requirement 6. Dairy animal feeds are conserved as per Livestock production manual (LPM) 7. Dairy animal feed waste is managed according to environmental protection regulations |
| 1. Apply hygienic milk production practices | 1. ***Milking materials and equipment*** are assembled based on the milking technique selected 2. Milking dairy animal are assembled in accordance with the LPM 3. Udder is cleaned and pre-dipped according to LPM 4. ***Mastitis test*** is carried out based LPM 5. Milk let down is stimulated based on selected ***milking technique*** 6. Milking is carried out based on Essentials of Clean Milk Production Standard. 7. Udder quarters are disinfected as per the LPM 8. Milked dairy animal is released as per work procedures 9. Milk is sieved and weighed according to the work procedures 10. Milk is stored and cooled in accordance with LPM 11. Milk production record is maintained based on the work procedures 12. Milking equipment are cleaned as per work procedures 13. Milking parlour is cleaned as per work procedures 14. Re-usable materials are stored as per manufactures instruction and work policy 15. Waste is managed and disposed with due regard to environment protection regulations |
| 1. Perform dairy practices | 1. Dairy *animal* ***identification method*** is selected based on Good Agricultural Practices (GAPs) 2. Dairy animal is dehorned or disbudded based on GAPs 3. Overgrown hooves are trimmed based on GAPs 4. Culling is performed based on work policy 5. Internal and external parasites are controlled based on LPM and GAPs 6. Vaccination is performed as per workplace policy, manufacturer’s instructions and LPM 7. Dairy animal isolation and quarantine is carried out to control notifiable diseases based on GAPs 8. Dairy animal is provided with clean water ad-libitum as per LPM |

**RANGE**

| **RANGE** | **VARIABLE** |
| --- | --- |
| 1. Dairy animal feeds may include but not limited to: | * Carbohydrates * Proteins * Vitamins * Minerals * Fats/ lipids * Water |
| 1. Components of animal feed rations may include but not limited to: | * Energy Sources * Protein Sources * Fiber Sources * Vitamins and Minerals * Additives and Supplements |
| 1. Dairy animal breeds method may include but not limited to: | * + Cow   + Goat   + Camel |
| 1. Milking materials and equipment may include but not limited to: | * Animal Restraint * Cleaning * Cups * Herd Test Buckets * Thermometer * Separator |
| 1. Mastitis test may include but not limited to: | * + CMT   + Strip cup |
| 1. Milking technique may include but not limited to: | * + Hand milking   + Milking machine |
| 1. Dairy animal identification method may include but not limited to: | * + Ear tagging   + Ear notching   + Branding   + Neck chains   + Straps with numbers   + Ear tattooing |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Principles of animal production
* Animal selection and breeding
* Dairy animal nutrition
* Parasite and disease management in cattle
* Dairy animal routine management practices
* Dairy animal production records

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Analytical
* Evaluation
* Management
* Problem solving
* Time management
* Data collection
* Numeracy
* Observation
* Negotiation
* Digital literacy
* Equipment calibration

**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. Carried out dairy animal breeding is based on LPM 2. Fed dairy animal as per animal feed requirement 3. Conserved dairy animal feeds as per Livestock production manual (LPM) 4. Carried out dairy animal milking based on Essentials of Clean Milk Production Standard 5. Cleaned milking equipment as per workplace procedures 6. Cleaned milking parlour as per workplace procedures 7. Dehorned or disbudded dairy animal based on GAPs. 8. Trimmed overgrown hooves based on GAPs 9. Performed culling based on workplace policy 10. Controlled internal and external parasites based on LPM and GAPs 11. Performed vaccination as per workplace policy, manufacturer’s instructions and LPM |
| 1. Resource   Implication | The following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed assessment activity or tasks |
| 1. Method of   Assessment | Competency in this unit may be assessed through:   * 1. Practical assessment   2. Questionnaires   3. Oral questioning   4. Projects   5. Written tests |
| 1. Context of   assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## APPLY DAIRY CHEMISTRY PRINCIPLES

**ISCED UNIT CODE: 0721 551 10A**

**Unit Description**

This unit specifies the competencies required by a Dairy Plant Technician level 6 to Apply Dairy Chemistry Principles. It involves applying physical properties, applying chemical properties and applying functional properties

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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 physical properties | 1. Physical properties of milk are applied in milk composition in accordance work requirements 2. Physical properties of milk are applied in milk quality control in accordance work requirements 3. Physical properties of milk are applied in ***processing operations*** in accordance work requirements |
| 1. Apply chemical properties | 1. Chemical properties of milk are applied in milk composition in accordance work requirements 2. Chemical properties of milk are applied in milk quality control in accordance work requirements 3. Chemical properties of milk are applied in processing operations in accordance work requirements 4. Chemical properties of milk are applied in product development in accordance work requirements |
| 1. Apply functional properties | 1. Functional properties of milk are applied sensory attributes enhancement in accordance to work requirements 2. Functional properties of milk are applied in nutritional quality improvement in accordance to work requirements. 3. Functional properties of milk are applied in product formulation in accordance to work requirements 4. Functional properties of milk are applied in product shelf stability in accordance to work requirements |

**REQUIRED KNOWLEDGE AND SKILLS**

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

Required knowledge

The individual needs to demonstrate knowledge of:

1. Physical properties of milk
2. Milk composition
3. Process induced changes

**Required skills**

The individual needs to demonstrate the following skills:

* Communication skills
* Problem solving
* Analytical skills
* Observation of laboratory safety

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Applied physical properties of milk in milk quality control in accordance work requirements   2. Applied chemical properties of milk in milk quality control in accordance work requirements   3. Applied functional properties of milk in nutritional quality improvement in accordance to work requirements. |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical assessment 2. Oral questioning 3. Portfolio of evidence 4. Interviews 5. Third party report 6. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## APPLIED RESEARCH

**UNIT CODE: 0811 511 11A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technologist level 6 to apply Research. It involves preparing scientific research proposal, applying scientific research methods and analyzing scientific research finding

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| **1.** Prepare scientific research proposal | 1. Scientific research problem is identified based on existing research gap 2. Research objectives are developed according to research problem 3. Research questions are designed based on research objectives   Scientific research proposal is developed as per standard research procedures |
| **2.** Apply scientific research methods | 1. ***Scientific study design*** is determined in accordance with research problem and research data 2. Sample size is determined based on the research methodology 3. ***Sampling techniques*** are determined in accordance with scope and research methodology 4. Ethical considerations are determined based on research methods utilized 5. Research materials are identified based on scope and research methodology 6. Data is collected in accordance with research methodology |
| 3. Analyze scientific research finding | 1. ***Data analysis methods*** are identified as per job requirement. 2. Data analysis is performed as per work procedure. 3. Research report is prepared as per work procedure. |

**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. Scientific study design may include but are not limited to: | * **Hypothesis** * **Study Population** * **Study design** * **Variables and measurements** * **Data** collection methods |
| 1. Sampling techniques may include but are not limited to: | * **Random Sampling** * **Stratified Sampling** * **Cluster Sampling** |
| 1. Data analysis methods may include but are not limited to: | * Descriptive statistics * Inferential statistics * Correlation analysis |

**REQUIRED KNOWLEDGE AND SKILLS**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Scientific research proposals
* Research methods
* Scientific research analysis
* Data collection techniques
* Types of research data

**Required skills**

The individual needs to demonstrate the following skills:

* Communication skills
* Problem solving
* Analytical skills
* Critical thinking
* Problem solving
* Ethical
* Social awareness

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Identified scientific research problem based on existing research gap   2. Developed research objectives according to research problem   3. Developed scientific research proposal as per standard research procedures   4. Determined Scientific study designs in accordance with research problem and research data   5. Identified research materials based on scope and research methodology   6. Collected Data in accordance with research methodology   7. Performed Data analysis as per work procedure.   8. Prepared research report as per work procedure. |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place 2. Access to relevant work environment 3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Practical assessment   2. Oral questioning   3. Portfolio of evidence   4. Third party report   5. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

# CORE UNITS OF COMPETENCY

## RAW MILK HANDLING

**ISCED UNIT CODE: 0721 451 12A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to handle raw milk. It involves procuring, grading and preserving raw milk.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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. Procure raw milk | * 1. Raw milk ***sources*** are identified as per work requirement.   2. Cost of raw milk is determined based on prevailing market price.   3. ***Raw milk*** ***supply agreement*** is prepared based on procurement laws   4. Raw milk is delivered in accordance to KS 1552 Code of hygienic practice for milk and milk products |
| 1. Grade raw milk | * 1. ***Grading tools, equipment and materials*** for testing raw milk are assembled according to job requirement.   2. Raw milk sample is collected as per KS ISO 707:2008 sampling of milk and milk products   3. ***Raw milk analysis*** is carried out in accordance KS ISO/TC 34/SC 5 milk and milk products   4. Raw milk is received based on Kenya Bureau of standards and dairy industry standards.   5. Raw milk quality records are updated based on work procedure.   6. Raw milk testing equipment are cleaned in accordance with KS1552-2016 Code of hygienic practice for milk and milk products |
| 1. Preserve raw milk | * 1. Raw milk is weighed in accordance with work procedures   2. Raw milk is ***bulked*** as per KS1552- 2016 Code of Hygienic practice for milk and milk products   3. Raw milk ***cooling parameters*** are set as per the KS1552- 2016 Code of hygienic practice for milk and milk products.   4. Raw milk cooling process is carried out as per equipment operational manual.   5. Raw milk cooling process is monitored as per work instruction manual.   6. Raw milk bulking ***records*** are documented based on work instruction manual   7. Raw milk handling equipment are cleaned in accordance with KS1552- 2016 Code of hygienic practice for milk and milk products |
| 1. Dispatch raw milk | * 1. Raw milk quality is determined in accordance with work procedures   2. Raw milk volume is determined in accordance with work procedures   3. Raw milk is loaded as per KS1552- 2016 Code of Hygienic practice for milk and milk products   4. Raw milk is dispatched in accordance to work procedures.   Raw milk stock is reconciled as per work instruction manual |

**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. Raw milk sources may include but are not limited to: | * Dairy cow * Dairy camel * Dairy goat |
| 1. Raw milk supply agreement may include but are not limited to: | * Quantity * Terms of payment * Delivery methods * Quality * Delivery time * Penalties * Review period |
| 1. Grading tools, equipment and materials may include but are not limited to: | **Tools and equipment**   * Alcohol gun * Plunger * Lactometer * Thermometer * Measuring cylinder * Test tubes * Centrifuge * Lovi bond Comparator   **Materials**   * Ethanol * Resazurin tablets * Antibiotic test kit * Aflatoxin test kit * Indicator * Sodium hydroxide |
| 1. Raw milk quality analysis may include but are not limited to: | * Organoleptic test * Compositional test * Resazurin test * Alcohol test * Lactometer test * Antibiotic test * pH test |
| 1. Bulked may include but are not limited to: | * Vats * Cans * Silo tanks |
| 1. Cooling parameters may include but are not limited to: | * Temperatures < 6 0C * Time * Temperature controls * Agitation |
| 1. Cooling process is monitoredmay include but are not limited to: | * Cooling time * Agitation * Temperatures |
| 1. Records may include but are not limited to: | * Quantity of raw milk received * Quality parameters * Farmer records |

**REQUIRED KNOWLEDGE AND SKILLS**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Microbial growth
* Milk composition
* Milk sampling techniques
* Milk quality testing techniques
* Milk preservation techniques
* Good manufacturing practices
* Code of hygiene
* Legal requirements
* Record keeping

**Required skills**

The individual needs to demonstrate the following skills:

* Communication skills
* Problem solving
* Analytical skills
* Weighing skills
* Milk handling skills
* Food safety risk assessment
* Milk equipment handling
* Training skills

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | * 1. Received raw milk based on Kenya Bureau of standards and dairy industry standards.   2. Raw milk quality analysis is carried out in accordance KS ISO/TC 34/SC 5 milk and milk products   3. Prepared raw milk supplyagreement based on procurement laws   4. Carried out raw milk cooling process as per equipment operational manual.   5. Cleaned raw milk handling equipment in accordance with KS1552- 2016 Code of hygienic practice for milk and milk products   6. Documented raw milk bulking based on work instruction manual |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Observation   2. Oral questioning   3. Portfolio of evidence   4. Third party report   5. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## PROCESS FLUID MILK PRODUCTS

**UNIT CODE: 0721 451 13A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to process fluid milk products. It involves processing Pasteurized milk, Ultra Heat Treated milk and Extended Shelf Life milk.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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. Process pasteurized milk | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Pasteurized milk processing materials and equipment*** are assembled based on work requirement.   4. Milk is standardized in line with Kenya Standards East Africa Standards (KS EAS) 69-2019   5. Standardized milk is homogenized in line with KS EAS 69-2019   6. Standardized milk is ***pasteurized*** in accordance with KS EAS 69-2019   7. **Pasteurization efficiency** is **assessed** as per pasteurized milk standards   8. AI is applied in pasteurized milk processing as per work instruction manual.   9. Pasteurized milk is packaged as per KS EAS 69-2019   10. Pasteurized milk is packaged sustainably as per work place procedures   11. Pasteurized milk is stored in accordance KS EAS 69-2019   12. Pasteurized milk processing equipment is cleaned as per code of hygienic practice for milk and milk products   13. Dairy waste is disposed as per (KS)1552- 2016 code of Hygienic practice for milk and milk products   14. Dairy waste is sustainably disposed as per work place procedure.   15. Pasteurized milk processing records are updated as per work instruction manual. |
| 1. **2.** Process ultra-high temperature milk | * 1. Raw milk sample is collected as per ISO 707:2008 Guidance on sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***UHT milk processing materials and equipment*** are assembled based on work requirement.   4. Milk is standardized in line with Kenya Standards East Africa Standards (KS EAS) 69-2019   5. Standardized milk is homogenized in line with KS EAS 69-2019   6. Standardized milk is pasteurized in accordance with KS EAS 27:2023 UHT milk- specification.   7. Pasteurized milk is stored in accordance with KS EAS 27:2023 UHT milk- specification.   8. Milk is sterilized in accordance with KS EAS 27:2023 UHT milk- specification.   9. UHT milk Sterility is assessed as per KS EAS 27:2023 UHT milk- specification.   10. AI is applied in UHT milk processing as per work instruction manual.   11. Sterilized milk is packaged as per KS EAS 27:2023 UHT milk- specification.   12. Sterilized milk is packaged sustainably as per work place procedures   13. Sterilized milk milk is stored in accordance KS EAS 63-2019   14. UHT milk processing equipment is cleaned as per code of hygienic practice for milk and milk products   15. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   16. Dairy waste is sustainably disposed as per work place procedure   17. Sterilized milk processing records are updated as per work instruction manual. |
| 1. Process lactose free milk | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Lactose free processing materials*** and equipment are assembled based on work requirement.   4. Milk is standardized in accordance with KS EAS 39   5. Standardized milk is homogenized in line with KS EAS 39   6. Milk is pasteurized in accordance with KS EAS 39.   7. Pasteurized milk undergoes lactase enzyme treatment in accordance to KS EAS 39.   8. Lactose free milk is pasteurized accordance to KS EAS 39.   9. AI is applied in Lactose free milk is processing as per work instruction   10. Lactose free milk is packaged as per KS EAS 39.   11. Lactose free milk is sustainably packaged as per work place procedures   12. Lactose free milk is stored in accordance KS EAS 39.   13. Processing equipment is cleaned as per code of hygienic practice for milk and milk products.   14. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   15. Dairy waste is sustainably disposed as per work place procedure   16. Lactose free milk processing records are updated as per work instruction manual |
| 1. Process milk substitutes products | 1. ***Milk substitute products*** are identified based on the type of substitute 2. ***Base ingredients*** are selected based on the type of substitute 3. Based ingredient is heat treated based on the type of substitute. 4. AI is applied in UHT milk processing as per work instruction manual 5. Milk substitutes product is packaged based on the type of substitute 6. Milk substitutes product is packaged sustainably as per work place procedures 7. Milk substitutes product is stored based on the type of substitute 8. Processing equipment is cleaned as per code of hygienic practice for milk and milk products. 9. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products 10. Dairy waste is sustainably disposed as per work place procedure 11. Milk substitute processing records are updated as per work instruction manual |

**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. Pasteurized milk processing materials and equipment may include but are not limited to: | **Materials**   * Raw milk * Milk powder * Anhydrous fat * Packaging material   **Equipment**   * Blender * Cream separator * Homogenizer * Pasteurizer * Milk silo tank * Packaging machine |
| 1. Pasteurization efficiency is assessed may include but are not limited to: | * Alkaline phosphatase test |
| 1. UHT processing materials and equipment may include but are not limited to: | * Homogenizer * Steriliser * Sterile tank * Aseptic packaging machines |
| 1. ***Lactose free processing materials*** may include but are not limited to: | * Lactase enzyme |
| 1. Pasteurized may include but are not limited to: | * Batch pasteurisation at <68OC for 30 minutes * Continuous pasteurisation <72OC for 15 seconds |
| 1. Sterilized may include but are not limited to: | * Heat treatment at ≤133OC for 5 seconds |
| 1. Sterility may include but are not limited to: | * Packet integrity * Sterilisation temperatures * Sterile packaging material |

**REQUIRED KNOWLEDGE AND SKILLS**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Dairy microbiology
* Dairy chemistry
* Milk sampling techniques
* Milk quality testing techniques
* Milk preservation techniques
* Good manufacturing practices
* Code of hygiene practices
* Legal requirements
* Record keeping
* Dairy waste and management

**Required skills**

The individual needs to demonstrate the following skills:

* Communication
* Problem solving
* Milk testing
* Analytical
* Milk handling
* Food safety risk assessment
* Milk equipment handling

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1.Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Sterilized milk in accordance with KS EAS 27:2023 UHT milk- specification.   2. Assessed pasteurization efficiency as per pasteurized milk standards   3. Assessed UHT milk sterility as per KS EAS 27:2023 UHT milk- specification.   4. Cleaned UHT milk processing equipment as per code of hygienic practice for milk and milk products   5. Pasteurized milk in accordance with KS EAS 69-2019   6. Cleaned pasteurized milk processing equipment as per code of hygienic practice for milk and milk products |
| 2.Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place 2. Access to relevant work environment 3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Observation   2. Oral questioning   3. Portfolio of evidence   4. Third party report   5. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## PROCESS FERMENTED MILK PRODUCTS.

**ISCED UNIT CODE: 0721 451 14A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to process Fermented Milk Products. It involves producing Yoghurt, Cultured and Kefir milk products.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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. Produce yoghurt product | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. Raw milk quality analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. Yoghurt processing materials and equipment are assembled based on work requirement.   4. Yoghurt product making is carried out in accordance with Kenya Standard East Africa Standard (KS EAS) 33-2006, Yoghurt — Specification   5. AI is applied in Yoghurt product making as per work place procedure.   6. Yoghurt product sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   7. Yoghurt product quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Yoghurt product is packaged in accordance with Kenya East Africa Standard (K EAS) 33-2006, Yoghurt — Specification.   9. Yoghurt product is sustainably packaged in accordance to work place procedure   10. Yoghurt product is stored in accordance with Kenya East Africa Standard (K EAS) 33-2006, Yoghurt — Specification   11. Yoghurt product processing equipment is cleaned as per code of hygienic practice for milk and milk products   12. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products Sustainable waste disposal   13. Dairy waste is sustainably disposed as per work place procedure.   14. Yoghurt product production records are updated as per work instruction manual |
| 1. Produce cultured milk product | * 1. Raw milk sample is collected as per Kenya Standard KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Cultured milk product processing materials and equipment*** are assembled based on work requirement.   4. Cultured milk product making is carried out in accordance with Kenya East Africa Standard (K EAS) 1008:2021 Fermented (cultured) milk — Specification.   5. AI is applied in cultured milk product making as per work place procedure.   6. Cultured milk sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   7. Cultured milk quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Cultured milk product is packaged in accordance with Kenya East Africa Standard (K EAS) 1008:2021 Fermented (cultured) milk — Specification   9. Cultured milk product is sustainably packaged as per work place procedure.   10. Cultured milk product is stored in accordance with Kenya Standard East Africa Standard (KS EAS) 1008:2021 Fermented (cultured) milk — Specification   11. Cultured milk product processing equipment is cleaned as per code of hygienic practice for milk and milk products   12. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   13. Dairy waste is sustainably disposed as per work place procedure.   14. Cultured milk product production records are updated as per work place manual. |
| 1. Produce kefir product | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Kefir product processing materials and equipment*** are assembled based on work requirement.   4. Kefir milk product making is carried out in accordance with East Africa Standard (EAS) 1008:2021 Fermented (cultured) milk — Specification.   5. AI is applied in Kefir milk product making as per work place procedures   6. Kefir product sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   7. Kefir product quality and safety is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Kefir milk product is packaged in accordance with East Africa Standard (EAS) 1008:2021 Fermented (cultured) milk — Specification   9. Kefir milk product is sustainably packaged as per work place procedures.   10. Kefir milk product is stored in accordance with East Africa Standard (EAS) 1008:2021 Fermented (cultured) milk — Specification   11. Kefir milk product processing equipment is cleaned as per code of hygienic practice for milk and milk products   12. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   13. Dairy waste is sustainably disposed as per work place procedures.   14. Kefir milk product production records are updated as per work instruction manual |

**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. Yoghurt processing materials and equipment may include but are not limited to: | Material   * Starter culture * Milk * Thickeners * Sweetener * Emulsifier * Stabilizers * Food colour * Flavours   **Equipment**   * Milk pasteurizer * Homogenizer * Fermentation tanks * Thermometers * Cooler |
| 1. Cultured milk product processing materials and equipment may include but are not limited to: | **Material**   * Starter culture * Milk * Thickeners * Sweetener * Emulsifier * Stabilizers * Food colour * Flavours   **Equipment**   * Milk pasteurizer * Homogenizer * Fermentation tanks * Thermometers * Cooler |
| 1. Kefir product processing materials and equipment may include but are not limited to: | **Material**   * Kefir grains * Milk * Thickeners * Sweetener * Emulsifier * Stabilizers * Food colour * Flavours   **Equipment**   * Milk pasteurizer * Homogenizer * Fermentation tanks * Thermometers * Cooler |

**REQUIRED KNOWLEDGE AND SKILLS**

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

The individual needs to demonstrate knowledge of:

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Dairy microbiology
* Dairy chemistry
* Milk sampling techniques
* Milk quality testing techniques
* Milk preservation techniques
* Good manufacturing practices
* Code of hygiene
* Legal requirements
* Record keeping
* Dairy waste and management
* Fermented milk technology

**Required skills**

The individual needs to demonstrate the following skills:

* Communication skills
* Problem solving
* Analytical skills
* Milk handling skills
* Food safety risk assessment
* Fermented equipment handling
* Fermented milk culture handling
* Fermented milk testing skill

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Carried out yoghurt product making in accordance with Kenya Standard East Africa Standard (KS EAS) 33-2006, Yoghurt — Specification   2. Carried out Cultured milk product making in accordance with Kenya East Africa Standard (K EAS) 1008:2021 Fermented (cultured) milk — Specification   3. Carried out Kefir milk product making in accordance with East Africa Standard (EAS) 1008:2021 Fermented (cultured) milk — Specification.   4. Analysed Yoghurt product quality in accordance with KS ISO/TC 34/SC 5 milk and milk products   5. Analyzed Cultured milk quality in accordance with KS ISO/TC 34/SC 5 milk and milk products   6. Processing equipment is cleaned as per code of hygienic practice for milk and milk products |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Practical assessment   2. Oral questioning   3. Portfolio of evidence   4. Interviews   5. Third party report   6. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## PROCESS CHEESE PRODUCTS

**ISCED UNIT CODE: 0721 451 15A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to process Cheese products. It involves producing Cheddar, Gouda Paneer, Mozzarella cheese, Processed and Cream cheese.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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. Produce cheddar cheese | * 1. Raw milk sample is collected as per Kenya Standard (KS) ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Cheddar cheese processing materials and equipment*** are assembled as per work requirement.   4. Cheddar cheese making is carried out in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   5. Cheddar cheese is ripened in accordance with KS 28-1, General standard for cheese.   6. AI is applied in Cheddar cheese making as per work place procedures.   7. Cheddar cheese sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   8. Cheddar cheese quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   9. Cheddar cheese is packaged in accordance with KS 28-1, General standard for cheese.   10. Cheddar cheese is sustainably packaged as per work place procedures.   11. Cheddar cheese is stored in accordance with KS 28-1, General standard for cheese.   12. Cheddar cheese processing equipment is cleaned as per code of hygienic practices for milk and milk products   13. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   14. Dairy waste is sustainably managed and disposed as per work place procedures.   15. Cheddar cheese production records are updated as per work instruction manual |
| 1. Produce gouda cheese | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Gouda cheese processing materials and equipment*** are assembled based on work requirement.   4. Gouda cheese making is carried out in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   5. Gouda cheese is ripened in accordance with KS 28-1, General standard for cheese.   6. AI is applied in Gouda cheese making as per work place procedures.   7. Gouda cheese sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   8. Gouda cheese quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   9. Gouda cheese is packaged in accordance with KS 28-1, General standard for cheese.   10. Gouda cheese is sustainably packaged as per work place procedures.   11. Gouda cheese is stored in accordance with KS 28-1, General standard for cheese.   12. Gouda cheese processing equipment is cleaned as per code of hygienic practices for milk and milk products   13. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   14. Dairy waste is sustainably managed and disposed as per work place procedures.   15. Gouda cheese production records are updated as per work instruction manual |
| 1. Produce paneer cheese | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Paneer cheese processing materials and equipment*** are assembled based on work requirement.   4. Paneer cheese making is carried out in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   5. AI is applied in Paneer cheese making as per work place procedures.   6. Paneer cheese sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   7. Paneer cheese quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Paneer cheese is packaged in accordance with KS 28-1, General standard for cheese.   9. Paneer cheese is sustainably packaged as per work place procedures.   10. Paneer cheese is stored in accordance with KS 28-1, General standard for cheese.   11. Paneer cheese processing equipment is cleaned as per code of hygienic practices for milk and milk products   12. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   13. Dairy waste is sustainably managed and disposed as per work place procedures.   14. Paneer cheese production records are updated as per work instruction manual |
| 1. Produce mozzarella cheese | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Mozzarella cheese processing materials and equipment*** are assembled based on work requirement.   4. Mozzarella cheese making is carried out in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   5. AI is applied in Mozzarella cheese making as per work place procedures.   6. Mozzarella cheese sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   7. Mozzarella cheese quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Mozzarella cheese is packaged in accordance with KS 28-1, General standard for cheese.   9. Mozzarella cheese is sustainably packaged as per work place procedures.   10. Mozzarella cheese is stored in accordance with KS 28-1, General standard for cheese.   11. Mozzarella cheese processing equipment is cleaned as per code of hygienic practices for milk and milk products   12. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   13. Dairy waste is sustainably managed and disposed as per work place procedures.   14. Mozzarella cheese production records are updated as per work instruction. |
| 1. Produce processed cheese | * 1. ***Processed cheese processing materials and equipment*** are assembled based on work requirement.   2. Processed cheese making is carried out in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   3. AI is applied in Processed cheese making as per work place procedures.   4. Processed cheese sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   5. Processed cheese quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   6. Processed cheese is packaged in accordance with KS 28-1, General standard for cheese.   7. Processed cheese is sustainably packaged as per work place procedures.   8. Processed cheese is stored in accordance with KS 28-1, General standard for cheese.   9. Processed cheese processing equipment is cleaned as per code of hygienic practices for milk and milk products   10. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   11. Dairy waste is sustainably managed and disposed as per work place procedures.   12. Processed cheese production records are updated as per work instruction manual |
| 1. Produce cream cheese | * 1. ***Processing materials and equipment*** are assembled based on work requirement.   2. Cream cheese making is carried out in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   3. AI is applied in Processed cheese making as per work place procedures.   4. Cream cheese sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   5. Cream cheese quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   6. Cream cheese is packaged in accordance with KS 28-1, General standard for cheese.   7. Cream cheese is sustainably packaged as per work place procedures.   8. Cream cheese is stored in accordance with KS 28-1, General standard for cheese.   9. Cream cheese processing equipment is cleaned as per code of hygienic practices for milk and milk products   10. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   11. Dairy waste is sustainably managed and disposed as per work place procedures.   12. Cream cheese production records are updated as per work instruction manual |
| 1. Produce Feta Cheese | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. Raw milk quality analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. Feta cheese processing materials and equipment are assembled based on work requirement.   4. Feta cheese making is carried out in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   5. Feta cheese sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   6. Feta cheese quality and safety is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   7. Feta cheese is packaged in accordance with (KS) 28-1, General standard for cheese.   8. Feta cheese is stored in accordance with (KS) 28-1, General standard for cheese.   9. Processing equipment is cleaned as per code of hygienic practice for milk and milk products   10. Dairy waste is disposed as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   11. Feta cheese production records are updated as per work instruction manual. |

**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.

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| **Variable** | **Range** |
| 1. Cheddar cheese processing materials and equipment may include but are not limited to: | **Material**   * Starter culture * Rennet * Food Colour * Salt   **Equipment**   * Cheese vat * Cheese press * Cheese mould * Knives * Cheese cloth * Miller * pH meter * Thermometer |
| 1. Gouda cheese processing materials and equipment may include but are not limited to: | **Material**   * Starter culture * Rennet * Food Colour * Salt   **Equipment**   * Cheese vat * Cheese press * Cheese mould * Knives * Cheese cloth * Thermometer * pH meter |
| 1. Paneer cheese processing materials and equipment may include but are not limited to: | **Material**   * Citric acid * Food Colour * Salt   **Equipment**   * Cheese vat * Cheese mould * Knives * Cheese cloth * Thermometer * pH meter |
| 1. Mozzarella cheese processing materials and equipment may include but are not limited to: | **Material**   * Starter culture * Rennet * Food Colour * Salt   **Equipment**   * Cheese vat * Knives * Stretcher |
| 1. Processed cheese processing materials and equipment may include but are not limited to: | **Material**   * Cheese * Food Colour * Food flavours * Emulsifier * Stabilizer * Salt * Permitted preservative * Skim milk power * Portable water   **Equipment**   * Batch pasteurizer * Cheese mould * Knives * Cheese vat |

**REQUIRED KNOWLEDGE AND SKILLS**

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

The individual needs to demonstrate knowledge of:

* Dairy microbiology
* Dairy chemistry
* Milk sampling techniques
* Milk quality testing techniques
* Good manufacturing practices
* Code of hygiene practices
* Dairy standards
* Record keeping
* Dairy waste and management
* Cheese technology

**Required skills**

The individual needs to demonstrate the following skills:

* Communication
* Problem solving
* Analytical
* Milk handling
* Cheese equipment handling
* Cheese making
* Milk testing

**EVIDENCE GUIDE**

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

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| 1.Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Carried out Cheddar cheese making in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   2. Carried out Gouda cheese making in accordance with Kenya Standard (KS) 28-1, General standard for cheese   3. Ripened Cheddar cheese in accordance with KS 28-1, General standard for cheese.   4. Ripened Gouda cheese in accordance with KS 28-1, General standard for cheese.   5. Carried out Paneer cheese making in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   6. Carried out Mozzarella cheese making in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   7. Carried out Processed cheese making in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   8. Carried out Cream cheese making in accordance with Kenya Standard (KS) 28-1, General standard for cheese.   9. Cheese quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   10. Cleaned cheese processing equipment as per code of hygienic practices for milk and milk products |
| 2.Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place 2. Access to relevant work environment 3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Practical assessment   2. Oral questioning   3. Portfolio of evidence   4. Third party report   5. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## PROCESS FAT BASED MILK PRODUCTS

**ISCED UNIT CODE: 0721 451 16A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 5 to process Fat Based Milk products. It involves producing dairy cream, dairy Butter, dairy Ghee and dairy Ice Cream.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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. Produce dairy cream | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk and ingredients samples analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Cream*** ***processing materials and equipment*** are assembled based on work requirement.   4. Dairy cream product is produced in accordance with KS 35:2018 Dairy cream and prepared creams – Specification   5. AI is applied in dairy cream production as per work place procedures.   6. Dairy cream product sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   7. Dairy ***cream product quality is analysed*** in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Dairy cream product is packaged in accordance with KS 35:2018 Dairy cream and prepared creams – Specification   9. Dairy cream product is sustainably packaged as per work place procedure.   10. Dairy cream product is stored in accordance with KS 35:2018 Dairy cream and prepared creams - Specification.   11. Dairy cream processing equipment is cleaned as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   12. Dairy waste is disposed as per KS 1552- 2016 code of Hygienic practice for milk and milk products   13. Dairy waste is sustainably managed and disposed as per work place procedures.   14. Dairy cream product production records are updated as per work instruction manual |
| 1. Produce dairy butter | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. Raw milk sample is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Butter processing materials and equipment*** are assembled based on work requirement.   4. Dairy butter making is carried out in accordance with KS EAS 22:2019 Butter - Specification   5. Dairy butter product sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   6. Dairy ***butter product quality is analysed*** in accordance with KS ISO/TC 34/SC 5 milk and milk products   7. AI is applied in Dairy butter making as per work place procedures.   8. Dairy butter is packaged in accordance with KS EAS 22:2019 Butter - Specification   9. Dairy butter is sustainably packaged as per work place procedures.   10. Dairy butter product is stored in accordance with KS EAS 22:2019 Butter - Specification   11. Dairy butter processing equipment is cleaned as per Kenya Standards (KS)1552- 2016 code of Hygienic practice for milk and milk products   12. Dairy waste is disposed as per KS1552- 2016 code of Hygienic practice for milk and milk products   13. Dairy waste is sustainably managed and disposed as per work place procedures.   14. Dairy butter product production records are updated as per work instruction manual. |
| 1. Produce dairy ghee | * 1. ***Ghee*** ***processing materials and equipment*** are assembled based on work requirement.   2. Dairy ghee making is carried out in accordance with KS 326 Specification for edible fats and oils   3. AI is applied in dairy ghee production as per work place procedures.   4. Dairy Ghee product sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   5. Dairy ***Ghee product quality is analysed*** in accordance with KS ISO/TC 34/SC 5 milk and milk products   6. Dairy ghee is packaged in accordance with KS 326 Specification for edible fats and oils   7. Dairy ghee product is sustainably packaged as per work place procedure.   8. Dairy ghee product is stored in accordance with KS 326 Specification for edible fats and oils   9. Dairy ghee product processing equipment is cleaned as per Kenya Standards (KS)1552- 2016 Code of Hygienic practice for milk and milk products   10. Dairy waste is disposed as per KS 1552- 2016 Code of Hygienic practice for milk and milk products   11. Dairy waste is sustainably managed and disposed as per work place procedures.   12. Dairy ghee product production records are updated as per work instruction manual. |
| 1. Produce dairy ice cream | * 1. ***Dairy Ice cream processing materials and equipment*** are assembled based on work requirement.   2. Dairy Ice cream making is carried out in accordance with Kenya Standard East Africa Standard (KS EAS 70) Dairy ice cream — Specification   3. AI is applied in Ice cream production as per work place procedures.   4. Dairy Ice Cream product sample is drawn as per KS ISO 707:2008 Sampling of milk and milk products   5. Dairy ***Ice Cream quality is analysed*** in accordance with KS ISO/TC 34/SC 5 milk and milk products   6. Dairy Ice cream product is packaged in accordance with (K EAS 70) Dairy ice cream — Specification   7. Dairy Ice cream product is sustainably packaged as per work place procedure.   8. Dairy Ice cream product is stored in accordance with (K EAS 70) Dairy ice cream — Specification   9. Dairy Ice cream product processing equipment is cleaned as Kenya Standards (KS)1552- 2016 Code of Hygienic practice for milk and milk products   10. Dairy waste is disposed as per KS1552- 2016 Code of Hygienic practice for milk and milk products.   11. Dairy waste is sustainably managed and disposed as per work place procedures Dairy Ice cream product production records are updated as per work instruction manual. |

**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.

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| **Variable** | **Range** |
| 1. Butter processing materials and equipment may include but are not limited to: | **Materials**   * Raw milk * Cream * Salt * Food colours   **Equipment**   * Cream separator * Butter churn |
| 1. Ghee Processing materials and equipment may include but are not limited to: | **Materials**   * Butter * Cream   Equipment   * Heat exchangers |
| 1. Dairy Ice cream processing materials and equipment may include but are not limited to: | **Materials**   * Milk powder * Sweeteners * Flavours * Food colour * Stabilizers * Emulsifiers   **Equipment**   * Ice cream freezer |
| 1. Cream product quality analysis may include but are not limited to: | * Acidity * Fat content * Yeast and mould * Coliforms plate count * Total plate count * Sensory evaluation |
| 1. Butter product quality is analysis may include but are not limited to: | * Fat content * Acidity * Yeast and mould * Coliforms plate count * Total plate count * Moisture content * Sensory evaluation |
| 1. Ice Cream quality is analysis may include but are not limited to: | * Acidity * Fat content * Yeast and mould * Coliforms plate count * Total plate count * Sensory evaluation |
| 1. Ghee product quality may include but are not limited to: | * Fat content * Yeast and mould * Coliforms plate count * Total plate count * Sensory evaluation |

**REQUIRED KNOWLEDGE AND SKILLS**

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

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Milk sampling techniques
* Milk tests
* Cream production
* Butter making technology
* Ghee making technology
* Ice cream technology
* Principles of sensory evaluation
* Codes of hygienic practice (s)
* Dairy products standards
* Good manufacturing practices
* Good laboratory practices
* Cleaning of processing equipment
* Dairy waste and management
* Records keeping

**Required skills**

The individual needs to demonstrate the following skills:

* Operation of cream separator
* Operation of butter churn
* Operation of ghee pot
* Operation of ice cream freezer.
* Measuring
* Milk sampling
* Milk testing
* Reagent preparation
* Food safety risk assessment and communication
* Food handling
* Computation
* Communication
* Documentation and record keeping
* Active listening
* Basic ICT
* Critical thinking
* Writing
* Problem solving
* Analytical

**EVIDENCE GUIDE**

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

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| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Produced dairy cream product in accordance with KS 35:2018 Dairy cream and prepared creams - Specification   2. Carried out Dairy butter making is in accordance with KS EAS 22:2019 Butter - Specification   3. Carried out Dairy ghee making in accordance with KS 326 Specification for edible fats and oils   4. Carried out Dairy Ice cream making in accordance with Kenya Standard East Africa Standard (KS EAS 70) Dairy ice cream — Specification   5. Analysed Dairy cream product quality in accordance with KS ISO/TC 34/SC 5 milk and milk products   6. Analysed Dairy butter product quality in accordance with KS ISO/TC 34/SC 5 milk and milk products   7. Dairy Ghee product quality is analysed in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Analysed Dairy Ice Cream quality in accordance with KS ISO/TC 34/SC 5 milk and milk products |
| 1. Resource implications | The following resources should be provided:   1. Assessment location / work place 2. Personal Protective Equipment |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical report 2. Observation 3. Oral questioning 4. Portfolio of evidence 5. Interviews 6. Third party report 7. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

**PROCESS CONCENTRATED AND DRIED MILK PRODUCTS**

**UNIT CODE: 0721 551 17A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technologist level 6 to process Concentrated and Dried Milk Products. It involves production of condensed, evaporated and dried milk products.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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. Produce Condensed Milk | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Condensed Milk processing materials and equipment*** are assembled based on work requirement.   4. Raw milk is standardized to the required fat content in accordance with work instructions.   5. ***Condensed milk*** is processed based on KS EAS 87:2019   6. Condensed milk products are packaged as per KS EAS 87:2019   7. Condensed milk is stored in accordance KS EAS 87:2019   8. Condensed milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   9. Condensed milk quality is analyzed in accordance with KS ISO/TC 34/SC 5 milk and milk products   10. Condensed milk processing equipment are cleaned according Kenya Standards (KS)1552- 2016 Code of Hygienic practice for milk and milk products   11. Dairy waste disposed as per KS 1552- 2016 code of Hygienic practice for milk and milk products   12. Condensed milk products processing is records are updated as per work instruction manual |
| 1. Produce Evaporated Milk | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Evaporated Milk processing materials and equipment*** are assembled based on work requirement.   4. Raw milk is standardized to the required fat content in accordance with work instructions.   5. Evaporated milk is processed based on KS 2510:2019   6. Evaporated milk is packaged as per KS 2510:2019   7. Evaporated milk is stored in accordance KS 2510:2019   8. Evaporated milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   9. Evaporated milk quality is analyzed in accordance with KS ISO/TC 34/SC 5 milk and milk products   10. Evaporated milk processing equipment are cleaned according Kenya Standards (KS)1552- 2016 Code of Hygienic practice for milk and milk products   11. Dairy waste disposed as per KS 1552- 2016 code of Hygienic practice for milk and milk products   12. Evaporated milk products processing is records are updated as per work instruction manual |
| 1. Produce Dried Milk product | * 1. Raw milk sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   2. ***Raw milk quality analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   3. ***Dried Milk product processing materials and equipment*** are assembled based on work requirement.   4. Raw milk is standardized to the required fat content in accordance with work instructions.   5. Dried Milk product is processed based on KS EAS 49:2023   6. Dried Milk product is packaged as per KS EAS 49:2023   7. Dried Milk product is stored in accordance KS EAS 49:2023   8. Dried Milk product sample is collected as per KS ISO 707:2008 Sampling of milk and milk products   9. Dried Milk product quality is analyzed in accordance with KS ISO/TC 34/SC 5 milk and milk products   10. Dried Milk product processing equipment are cleaned according Kenya Standards (KS)1552- 2016 Code of Hygienic practice for milk and milk products   11. Dairy waste disposed as per KS 1552- 2016 code of Hygienic practice for milk and milk products   12. Dried Milk product products processing is records are updated as per work instruction manual |

**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.

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| **Variable** | **Range** |
| 1. Raw milk analysis may include but are not limited to: | * Organoleptic test * Compositional test * Resazurin test * Alcohol test * Lactometer test * Antibiotic test * pH test |
| 1. Condensed Milk processing materials and equipmentmay include but are not limited to: | Material   * Milk * Sugar   **Equipment**   * Stainless steel vessel * Evaporator * Heat source * Mixer * Condenser * Packaging equipment |
| 1. Evaporated Milk processing materials and equipment may include but are not limited to: | Material   * Milk   **Equipment**   * Evaporator * Homogenizer * Retort * Canning line * Packaging equipment |
| 1. Dried Milk product processing materials and equipmentmay include but are not limited to: | Material   * Milk   **Equipment**   * Pasteuriser * Cream separator * Evaporator * Homogenizer * Drier |

**REQUIRED KNOWLEDGE AND SKILLS**

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

The individual needs to demonstrate knowledge of:

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Physical and chemical properties of milk and milk products
* Milk concentration techniques
* Milk drying techniques
* Milk sampling techniques
* Milk quality testing techniques
* Milk preservation techniques
* Good manufacturing practices
* Code of hygiene
* Legal requirements
* Record keeping
* Dairy waste and management

**Required skills**

The individual needs to demonstrate the following skills:

* Communication skills
* Problem solving
* Analytical skills
* Milk handling skills
* Food safety risk assessment

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. ***Processed condensed milk*** based on KS EAS 87:2019   2. Packaged condensed milk products as per KS EAS 87:2019   3. Analyzed condensed milk quality in accordance with KS ISO/TC 34/SC 5 milk and milk products   4. Processed evaporated milk based on KS 2510:2019   5. Packaged evaporated milk as per KS 2510:2019   6. Analyzed evaporated milk quality in accordance with KS ISO/TC 34/SC 5 milk and milk products   7. Processed dried Milk product based on KS EAS 49:2023   8. Packed dried Milk product as per KS EAS 49:2023   9. Analysed Dried Milk product quality in accordance with KS ISO/TC 34/SC 5 milk and milk products |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Practical assessment   2. Oral questioning   3. Portfolio of evidence   4. Interviews   5. Third party report   6. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## CONDUCT DAIRY PRODUCT QUALITY CONTROL

**ISCED UNIT CODE: 0721 451 18A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 6 to Conduct Dairy Product quality control. It involves analyzing raw materials and ingredients, monitoring production process, analyzing end product quality and implementing quality control measures.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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. Analyse raw materials and ingredients | * 1. ***Laboratory reagents*** are prepared as per manufacturer’s instructions.   2. ***Laboratory tools and equipment*** are assembled as per instructional manuals.   3. ***Raw milk and ingredients*** sample***s*** are collected as per ISO 707:2008 Sampling of milk and milk products.   4. ***Raw milk and ingredients samples analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   5. AI is applied in raw milk and ingredients samples analysis as per work place procedures.   6. Raw milk and ingredients test records are updated as per work instruction manual.   7. Laboratory tools and equipment are cleaned according to good laboratory practices.   8. Laboratory waste is disposed as per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products.   9. Laboratory waste is sustainably managed and disposed as per work place procedures. |
| 1. Monitor production process | * 1. Laboratory reagentsare prepared as per KS ISO/TC 34/SC 5 milk and milk products   2. Laboratory tools and equipment are assembled as per instructional manuals.   3. ***Semi-finished milk product*** sample***s*** are collected as per ISO 707:2008 Sampling of milk and milk products.   4. ***Semi-finished milk product samples analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   5. Semi-finished milk productsample***s*** test records are updated as per work instruction manual.   6. AI is applied in Semi-finished milk productsamples analysis as per work place procedures   7. Laboratory tools and equipment are cleaned according to good laboratory practices.   8. Laboratory waste is disposed per (KS) 1552: 2016 Code of hygienic practice for milk and milk products.   9. Laboratory waste is sustainably managed and disposed as per work place procedures. |
| 1. Analyse end product quality | * 1. Laboratory reagentsare prepared as per KS ISO/TC 34/SC 5 milk and milk products   2. Laboratory tools and equipment are assembled as per instructional manuals   3. ***End milk product*** sample***s*** are collected as per ISO 707:2008 Sampling of milk and milk products.   4. ***End milk product samples analysis*** in accordance with KS ISO/TC 34/SC 5 milk and milk products   5. AI is applied in End milk productsample***s*** analysis as per work place procedures   6. Laboratory waste is sustainably managed and disposed as per work place procedures.   7. End milk productsample***s*** test records are updated as per work instruction manual   8. ***End product storage conditions*** are monitoredas per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products.   9. Laboratory tools and equipment are cleaned according to good laboratory practices.   10. Laboratory waste is disposed per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products. |
| 1. Analyse product handling condition quality | * 1. Laboratory reagentsare prepared as per KS ISO/TC 34/SC 5 milk and milk products   2. Laboratory test tools and equipment are assembled as per instructional manuals.   3. Laboratory tools and equipment are ***calibrated*** as per KEBS standards***.***   4. ***Specimen samples*** are collected as per ISO 707:2008 sampling of milk and milk products.   5. Specimen samples analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   6. AI is applied in Specimen samples samples analysis as per work place procedures   7. Laboratory tools and equipment are cleaned according to good laboratory practices.   8. Laboratory waste is disposed per good laboratory practices   9. Laboratory waste is sustainably managed and disposed as per work place procedures.   10. Laboratory equipment and reagents inventory is updated as per KS 1552: 2016 Code of hygienic practice for milk and milk products. |

**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.

|  |  |
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| **Variable** | **Range** |
| 1. Laboratory reagents may include but are not limited to: | * Media * Diluents * Indicators * Solvent * Buffers * Dyes * Stains |
| 1. Laboratory tools and equipment may include but are not limited to: | * Microscopes * Beakers * Flasks * Test Tube * Pipettes * Burettes * Balances * Scales * Heating * Equipment * Centrifuges * Autoclaves * Sterilizers * Incubators * Gloves * Safety Goggles * Lab Coats * pH Meters * Water Baths |
| 1. Raw milk and ingredients analysis may include but are not limited to: | * Organoleptic * Alcohol * Acidity * Antibiotic * Lactometer * Resazurin * Butter fat * Peroxide |
| 1. Semi-finished milk product analysis may include but are not limited to: | * Phosphatase * Peroxidase * Acidity * Salt content * Moisture content * Butter fat content * pH |
| 1. End milk product analysis may include but are not limited to: | * Phosphatase * Sterility * Peroxidase * Acidity * Salt content * Butter fat content * pH * Total plate count * Coliforms plate count * Yeast and mould count |
| 1. Specimen samples may include but are not limited to: | * Churn rinse * Equipment swab * Trapped air * Personnel swab |
| 1. End product storage conditions may include but are not limited to; | * Room temperature * Refrigeration temperature * Humidity * Frozen condition |

**REQUIRED KNOWLEDGE AND SKILLS**

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

The individual needs to demonstrate knowledge of:

* Standards for Dairy products
* Quality control and assurance.
* Dairy microbiology
* Dairy chemistry
* HACCP process
* Codes of hygienic practice (s)
* Relevant regulations
* Sampling techniques
* Principles of sensory evaluation
* Good manufacturing practices
* Good laboratory practices
* Cleaning of quality control facilities
* Laboratory waste and management
* Record keeping

**Required skills**

The individual needs to demonstrate the following skills:

* Active listening
* Reflecting
* Paraphrasing
* Clarifying
* Questioning
* Basic ICT
* Critical thinking
* Writing
* Problem solving
* Operation of quality control equipment
* Measuring
* Sampling
* Trouble-shooting
* Equipment maintenance
* Milk testing
* Reagent and Media preparation
* Computation

**EVIDENCE GUIDE**

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

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| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. End milk product samples analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   2. Collected End milk product samples as per ISO 707:2008 Sampling of milk and milk products.   3. Specimen samples analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   4. Collected specimen samples as per ISO 707:2008 Sampling of milk and milk products.   5. Verified production processes are as per instructional manuals.   6. Collectedraw milk and ingredientssample***s*** as per ISO 707:2008 sampling of milk and milk products.   7. Raw milk and ingredients samples analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Collected Semi-finished milk product samples as per ISO 707:2008 sampling of milk and milk products.   9. Semi-finished milk product samples analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Personal Protective Equipment and Apparel |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical report 2. Observation 3. Oral questioning 4. Portfolio of evidence 5. Interviews 6. Third party report 7. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

# CONDUCT DAIRY PRODUCT QUALITY ASSURANCE

**UNIT CODE: 0721 551 19A**

**UNIT DESCRIPTION**

This unit specifies the competencies required by a Dairy Plant Technician level 6 to conduct dairy product quality assurance. It involves analyzing applying quality control systems, applying quality control regulation and carrying out raw milk quality analysis. Aspects of the basic units incorporated here include solving tasks using office suite, managing data and information and applying self-management skills.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| **ELEMENT**  These describe the key outcomes which make up workplace functions | **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 quality control systems | * 1. ***Laboratory reagents*** are prepared as per manufacturer’s instructions.   2. ***Laboratory tools and equipment*** are assembled as per instructional manuals.   3. ***Raw milk and ingredients*** sample***s*** are collected as per ISO 707:2008 Sampling of milk and milk products.   4. ***Raw milk and ingredients samples analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   5. AI is applied in raw milk and ingredients samples analysis as per workplace procedures.   6. Raw milk and ingredients test records are updated as per work instruction manual.   7. Laboratory tools and equipment are cleaned according to good laboratory practices.   8. Laboratory waste is disposed as per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products.   9. Laboratory waste is sustainably managed and disposed as per workplace procedures. |
| 1. Apply quality control Regulation | * 1. Laboratory reagentsare prepared as per KS ISO/TC 34/SC 5 milk and milk products   2. Laboratory tools and equipment are assembled as per instructional manuals.   3. ***Semi-finished milk product*** sample***s*** are collected as per ISO 707:2008 Sampling of milk and milk products.   4. ***Semi-finished milk product samples analysis*** is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   5. Semi-finished milk productsample***s*** test records are updated as per work instruction manual.   6. AI is applied in Semi-finished milk productsamples analysis as per workplace procedures   7. Laboratory tools and equipment are cleaned according to good laboratory practices.   8. Laboratory waste is disposed per (KS) 1552: 2016 Code of hygienic practice for milk and milk products.   9. Laboratory waste is sustainably managed and disposed as per workplace procedures. |
| 1. Carryout Raw milk quality Analysis | * 1. Laboratory reagentsare prepared as per KS ISO/TC 34/SC 5 milk and milk products   2. Laboratory tools and equipment are assembled as per instructional manuals   3. ***End milk product*** sample***s*** are collected as per ISO 707:2008 Sampling of milk and milk products.   4. ***End milk product samples analysis*** in accordance with KS ISO/TC 34/SC 5 milk and milk products   5. AI is applied in End milk productsample***s*** analysis as per workplace procedures   6. Laboratory waste is sustainably managed and disposed as per workplace procedures.   7. End milk productsample***s*** test records are updated as per work instruction manual   8. ***End product storage conditions*** are monitoredas per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products.   9. ***Specimen samples*** are collected as per ISO 707:2008 sampling of milk and milk products   10. Specimen samples analysis is carried out in accordance with KS ISO/TC 34/SC 5 milk and milk products   11. AI is applied in Specimen samples samples analysis as per workplace procedures   12. Laboratory tools and equipment are cleaned according to good laboratory practices.   13. Laboratory waste is disposed per Kenya Standard (KS) 1552: 2016 Code of hygienic practice for milk and milk products. |

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Laboratory reagents may include but are not limited to: | * Media * Diluents * Indicators * Solvent * Buffers * Dyes * Stains |
| 1. Laboratory tools and equipment may include but are not limited to: | * Microscopes * Beakers * Flasks * Test Tube * Pipettes * Burettes * Balances * Scales * Heating * Equipment * Centrifuges * Autoclaves * Sterilizers * Incubators * Gloves * Safety Goggles * Lab Coats * pH Meters * Water Baths |
| 1. Raw milk and ingredients analysis may include but are not limited to: | * Organoleptic * Alcohol * Acidity * Antibiotic * Lactometer * Resazurin * Butter fat * Peroxide |
| 1. Semi-finished milk product analysis may include but are not limited to: | * Phosphatase * Peroxidase * Acidity * Salt content * Moisture content * Butter fat content * pH |
| 1. End milk product analysis may include but are not limited to: | * Phosphatase * Sterility * Peroxidase * Acidity * Salt content * Butter fat content * pH * Total plate count * Coliforms plate count * Yeast and mould count |
| 1. Specimen samples may include but are not limited to: | * Churn rinse * Equipment swab * Trapped air * Personnel swab |
| 1. End product storage conditions may include but are not limited to; | * Room temperature * Refrigeration temperature * Humidity * Frozen condition |

**REQUIRED KNOWLEDGE AND SKILLS**

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

The individual needs to demonstrate knowledge of:

* Standards for Dairy products
* Quality control and assurance.
* Dairy microbiology
* Dairy chemistry
* HACCP process
* Codes of hygienic practice (s)
* Relevant regulations
* Sampling techniques
* Principles of sensory evaluation
* Good manufacturing practices
* Good laboratory practices
* Cleaning of quality control facilities
* Laboratory waste and management
* Record keeping

**Required skills**

The individual needs to demonstrate the following skills:

* Active listening
* Reflecting
* Paraphrasing
* Clarifying
* Questioning
* Basic ICT
* Critical thinking
* Writing
* Problem solving
* Operation of quality control equipment
* Measuring
* Sampling
* Troubleshooting
* Equipment maintenance
* Milk testing
* Reagent and Media preparation
* Computation

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Carried out end milk product samples analysis in accordance with KS ISO/TC 34/SC 5 milk and milk products   2. Collected End milk product samples as per ISO 707:2008 Sampling of milk and milk products.   3. Carried out specimen samples analysis in accordance with KS ISO/TC 34/SC 5 milk and milk products   4. Collected specimen samples as per ISO 707:2008 Sampling of milk and milk products.   5. Verified production processes are as per instructional manuals.   6. Collectedraw milk and ingredientssample***s*** as per ISO 707:2008 sampling of milk and milk products.   7. Carried out raw milk and ingredients samples analysis in accordance with KS ISO/TC 34/SC 5 milk and milk products   8. Collected Semi-finished milk product samples as per ISO 707:2008 sampling of milk and milk products.   9. Carried out semi-finished milk product samples analysis in accordance with KS ISO/TC 34/SC 5 milk and milk products   10. Solved tasks using the office suite as per workplace policies and regulations.   11. Managed data and information as per workplace policies and regulations.   12. Applied self-management skills as per organizational procedures. |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Personal Protective Equipment and Apparel |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical report 2. Observation 3. Oral questioning 4. Portfolio of evidence 5. Interviews 6. Third party report 7. Written tests |
| 1. Context of assessment | Competency may be assessed:  4.1 Workplace  4.2 Simulated work environment |
| 1. Guidance information for assessment | 5.1 Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |