

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARD**

**FOR**

**BEE HIVES AND BEE EQUIPMENT CONSTRUCTION ARTISAN**

**KNQF LEVEL 3**

**ISCED CODE: 0214 254A**

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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. A key feature of this policy is the radical change in the design and delivery of TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that these occupational standards have been developed.

It is my conviction that these occupational standards will play a great role towards development of competent human resource for the Agriculture Sector’s growth and 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. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labor force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Agriculture Sector Skills Advisory Committee (SSAC) have developed these occupational standards.

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

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

# ACKNOWLEDGMENT

These occupational standards have been designed for competency-based training and has independent competencies of learning that allow the trainee flexibility in entry and exit. In developing the occupational standards, significant involvement and support was received from various organizations.

I recognize with appreciation the role of the Agriculture Sector Skills Advisory Committee (SSAC) in ensuring that competencies required by the industry are addressed in the standards. I also thank all stakeholders in the Apiculture sector for their valuable input and all those who participated in the process of developing these occupational standards.

I am convinced that these occupational standards will go a long way in ensuring that workers in Apiculture Sector acquire competencies that will enable them to perform their work more efficiently.

Table of Contents

[FOREWORD iii](#_Toc195713286)

[PREFACE iv](#_Toc195713287)

[ACKNOWLEDGMENT v](#_Toc195713288)

[ACRONYMS AND ABBREVIATIONS 2](#_Toc195713289)

[KEY TO ISCED UNIT CODE 3](#_Toc195713290)

[OVERVIEW 4](#_Toc195713291)

[CONSTRUCT BEE HIVES AND BEE EQUIPMENT 5](#_Toc195713292)

[FABRICATE BEE EQUIPMENT ACCESSORIES 12](#_Toc195713293)

# **ABBREVIATIONS AND ACRONYMS**

AGR Agriculture

APIHE Apiculture Hives and Equipment

BC Basic Competency

CC Core Competency

CO Common Units

CR Core competencies

CDACC Curriculum Development Assessment and Certification Council

OSHA Occupation Safety and Health Act

PPE Personal Protective Equipment

SSAC Sector Skills Advisory Committee

TVET Technical and Vocational Education and Training

TVETA Technical and Vocational Education and Training Authority

**KEY TO ISCED UNIT CODE**



# OVERVIEW

The Bee hives and bee equipment level Four qualification consists of competencies that a person must achieve to construct bee hives and bee equipment construction and fabricate bee equipment accessories within the institution’s/organizations acceptable standard operating procedures (SOPs).

This course consists of core units of learning as indicated below:

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| 0214 351 01A | Construct bee hives and bee equipment |
| 0214 351 02A | Fabricate bee equipment Accessories |

# CONSTRUCT BEE HIVES AND BEE EQUIPMENT

**UNIT CODE:** 0214 251 01A

**UNIT DESCRIPTION**

This unit specifies the competencies required to construct bee hives. It involves preparing to construct bee hives, constructing Kenya Top Bar Hive, Langstroth Hive, catcher box, observation hive and post construction of hives and catcher box and observation hives

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the **key outcomes** which make up **workplace function**. | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the Range*** |
| 1. Prepare to construct bee hives | 1. Type of hives identified (Traditional -log, bark, bricks, mud, and reeds. Improved hives- Kenya Top Bar Hive, Langstroth hive) 2. ***Materials and equipment for construction*** of hives are identified as per the type of hive 3. Personal protective equipment is worn as per the occupational health and safety procedures |
| 1. Construct Kenya Top Bar Hive | * 1. ***Materials and equipment*** for construction are assembled as per the requirements   2. The timber is seasoned as per work place procedures   3. The timber is planed to the recommended thickness   4. ***Components*** of the hive and their measurements are identified   5. The timber is cut/ split to size as per the component standard specification   6. Different hive components are constructed as per standard specification   7. The lid material is cut as per standard specification   8. Queen excluder is constructed as per the standard specification   9. Bee entrances holes are drilled on one end as per the workplace procedures   10. Various components are assembled according to the work place procedures   11. Hive hanging wires are fixed as per work place procedure |
| 1. Construct Langstroth Hive | * 1. Materials and equipment for construction are identified and assembled as per the requirements   2. The timber is seasoned as per work place procedures   3. The timber is planed to the recommended thickness   4. Components of the hive and their measurements are identified   5. The timber is cut/ split to size as per the component specification   6. Different hive components are constructed as per standard specification   7. The lid material is cut as per standard specification   8. Queen excluder is constructed as per the standard specification   9. Various components are assembled according to the work place procedure |
| 1. Construct catcher box | * 1. Type of catcher box identified and assembled as per the hive to be stocked   2. Materials and equipment for construction are assembled as per the requirements   3. The timber is season as per work place procedures   4. The timber is planed to the recommended thickness   5. Components of the catcher box and their measurements are identified   6. The timber is cut/ split to size as per the component standard specification   7. The lid material is cut as per standard specification   8. Bee entrances/holes are drilled on one end as per work place procedure   9. Various components are assembled according to the work place procedures   10. Hanging wires are fixed as per work place procedure |
| 1. Construct observation hive | * 1. Observation hive is identified as per the workplace procedures   2. Materials and equipment for construction are identified and assembled as per the requirements   3. The timber is season as per work place procedures   4. The timber is planed to the recommended thickness   5. Components of the observation hive and their measurements are identified   6. The timber and glass are cut/ split to size as per the component standard specification   7. The lid material is cut as per standard specification   8. Bee entrances/holes are drilled on one end   9. Various components are assembled according to the work place procedures |
| 1. Post construction of hives and catcher box and observation hives | 1. Hives and catcher boxes are baited as per work place procedures 2. Hives, catcher box and observation hives are stored as per the workplace procedures 3. ***Waste is managed and disposed*** appropriately as per NEMA and workplace procedures |
| 1. Perform digital record keeping | * 1. **Word processing concepts** are applied in solving workplace tasks as per job requirements.   2. Netiquette principles are observed as per work requirements.   3. Internet search is performed using clear parameters as per job requirements.   4. Electronic mail communication is executed in accordance with workplace policy. |

**RANGE**

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

|  |  |
| --- | --- |
| Variables | Range |
| 1. Materials and equipment for construction may include but not limited to: | * Timber * Flat metal bar * File for sharpening * Nails, hammers * Wood plainer * Joinery equipment * Tape measure * Iron sheets * Galvanized aluminum sheets and wire * Drilling machine * Pliers * Cotton material * Goose net * Coffee wire * Leather/Rexene gloves * Sewing machine * Tailoring scissors * Tin sip * Zips and elastic material |
| 1. Bee equipment may include but not limited to: | * Smokers * Hive tools * Honey extractors * Bee brush * Honey strainers * Sisal yarn * Solar wax extractors * Observation hive * Honey press * Steam wax extractor * PPE * Pollen trap * Catcher box * Propolis collector |
| 1. Waste is managed and disposed may include but not limited to: | * Burning * Burying * Recycling * Selling |
| 1. Word processing concepts may include but not limited to: | * Creating word documents * Editing word documents * Formatting word documents * Save word documents * Printing word documents |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking
* Bee hive construction skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of hives and bee equipment
* Types of hives
* Hive standard specifications
* Evaluation of hive and bee equipment
* Waste Disposal procedures.
* Workshop technology
* Machine operation
* Maintenance of equipment

**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. Assembled materials and equipment for construction of hives as per the type of hive and bee equipment.   2. Donned personal protective equipment as per the occupational health and safety procedures   3. Constructed and evaluated quality of hives and bee equipment as per standard specifications   4. Stored hives and equipment as per the workplace procedures   5. Managed and disposed waste appropriately as per NEMA and workplace procedures |
| 1. Resource Implications for competence certification | The following resources should be provided:   * 1. Access to relevant workplace   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   * On-the-job * During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# FABRICATE BEE EQUIPMENT ACCESSORIES

**UNIT CODE:** 0214 251 02A

**UNIT DESCRIPTION**

This unit specifies the competencies required to fabricate bee equipment accessories (smoker, hive tool, bee brush, feeder box). It involves preparing to fabricate a bee smoker, fabricating the smoker, a hive tool, constructing bee brush and conducting post-construction activities and bee equipment

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the **key outcomes** which make up **workplace function**. | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the Range*** |
| 1. Prepare to fabricate a bee smoker | * 1. **Materials and equipment** for fabricating a smoker are identified and assembled as per the work place procedures   2. The **components of a smoker** (nozzle, smoker barrel, spring) identified as per the work place procedures  1. Personal protective equipment is worn as per the occupational health and safety procedures |
| 1. Fabricate the smoker | 1. Measure, cut, shape and make the nozzle 2. Measure, cut and shape material into shape of the barrel 3. Close the bottom of the barrel and smoothen the edges 4. Measure and cut the material for the smoker pump(bellows) 5. Fix the pump spring and leather/rexin material 6. Assemble the smoker components and fix the handle 7. Finish by Smoothening all the sharp/rough edges 8. The quality of the smoker is evaluated as per the standard specifications |
| 1. Fabricate a hive tool | * 1. Materials and equipment for making the hive tool are assembled as per the requirements   2. Measure and cut the material to size   3. Curve one end according to the specification   4. Sharpen both ends   5. Smoothen and paint according to the work place procedures |
| 1. Construct bee brush | * 1. Materials and equipment for making a bee brush are identified and assembled as per the workplace procedures   2. Sisal fibers are cut into the recommended length as per workplace procedures   3. Timber handle is cut and designed as per the specifications   4. Sisal fibers are fixed onto the handle as per the workplace procedures   5. Sisal fibers are trimmed as per the workplace procedures |
| 1. Conduct post-construction activities and bee equipment | 1. Hives and equipment are stored as per the workplace procedures 2. ***Waste is managed and disposed*** appropriately as per NEMA and workplace procedures |
| 1. Maintain ethical work practices and values | * 1. Personal management is demonstrated through self-awareness, self-esteem, emotional intelligence, stress management and assertiveness based on scope of work.   2. Policies and guidelines are observed as per the workplace requirements   3. Self-worth and professionalism is exercised in line with ***personal goals*** and organizational policies   4. Code of conduct is observed as per the workplace requirements   5. Teamwork is applied as per work place requirements   6. **Conflicts** are resolved between ***team*** members in line with organization policy.   7. ***Creative, innovative*** and practical solutions are developed based on the problem   8. ***Customer*** concerns and complaints are analyzed and resolved in line with the set organizational culture. |

**RANGE**

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|  |  |
| --- | --- |
| Variables | Range |
| 1. Customer may include but not limited to: | * Loyal * Discount * Impulse * Need-based * Wandering |
| 1. Team may include but not limited to: | * Small workgroup * Staff in a section/department * Inter-agency Group * Virtual teams |
| 1. Creative and Innovation 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 |
| 1. Materials and equipment for fabrication may include but not limited to | * Timber * Flat metal bar * File for sharpening * Nails, hammers * Wood plainer * Joinery equipment * Tape measure * Iron sheets * Galvanized aluminum sheets and wire * Drilling machine * Pliers * Cotton material * Goose net * Coffee wire * Leather/Rexene gloves * Sewing machine * Tailoring scissors * Tin sip * Zips and elastic material |
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| 1. Context of Assessment | Assessment could be conducted:   * On-the-job * In a simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |