THE NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

OCCUPATIONAL STANDARDS

OCCUPATION: FOOD INSPECTION AND TESTING ENGINEER

LEVEL: NTA LEVEL 7

FEBRUARY 2024

Abbreviations

CBET	Competency Based Education and Training
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
LIMS	Laboratory Information Management System
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standard
OS	Occupational Standard
OSHA	Occupational Safety and Health Administration
TBS	Tanzania Bureau of Standards
TET	Technical Education and Training
TFDA	Tanzania Food and Drug Administration
TVET	Technical and Vocational Education and Training

Glossary of Terms

Detailed knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title.(Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate the expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.

Standards:	It is a set of statement, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, related knowledge, attitudes, performance criteria, tools and materials needed, and safety concerns required of employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps, and leads to a product, service, or decision.
Underpinning Knowledge:	This is crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis.Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.
Occupational Competence:	The application of knowledge and skills to perform consistently to the standards required in the work context.

1.0. Introduction

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status, with a high level of human development. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical and Vocational Education and Training (NACTVET) has begun the job of drafting Occupational Standards (OS) that will eventually be adopted as National Occupational Standards (NOS) for use in the delivery of TET that meets the needs of the labour market and the country's economic agenda.

Occupational Standards (OS) are performance criteria that are matched with labour market demands. Each of them describes the functions, performance standards, and understanding or knowledge underpinning a given occupation. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruitment, supervision, and appraisal, as well as TET Standards. They are also helpful for benchmarking and harmonizing job qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in application across all public and private institutions.

However, it must be noted that Occupational Standards are different from Training /Education Standards. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical circuits, performs troubleshooting in electrical circuits, etc.), and are usually defined by Employers following procedures as agreed upon by all the stakeholders. On the other hand, Training and Education Standards are developed from the activities defined in the occupational standards, and they specify learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him/her to function at an agreed level in an occupation. Training and Education Standards are used to define curricula in training institutions. It is critical, however, to establish a direct link between the occupational standards and the training standards for both of them to respond collaboratively to the demands of the labour market.

For the purpose of TET delivery, Tanzania has adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus

the starting point for developing competency-based training (CBET) programmes. Therefore, it is quite pertinent for TET institutions to use the relevant occupational standards as a benchmark for formulating their curricula.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training.

The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0 OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The process of developing these Occupational Standards involved both local and international expertise. The process began with an examination of major documents that guide Tanzanian skills development including the *10-year National Skills Development Strategy (2016-2026).* NACTVET labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a team of experts in consultation with practitioners developed draft occupational standards. The draft document was used to develop an occupational profile for each occupation (DACUM Chart), which is attached as an **Appendix** to every Occupational Standard.

The occupational standards were validated during the stakeholders' forum held on 22nd and 23rd February 2024 at Morogoro. The information from the stakeholders' forum provides insight from the workplace, professional bodies, regulatory bodies and sector ministries regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation.

3.0 THE SCOPE AND OVERVIEW OF THE OCCUPATIONAL STANDARDS FOR FOOD INSPECTION AND TESTING ENGINEERS

These standards cover a broad range of duties and tasks that can be performed by a Food Inspection and Testing Engineer. However, the occupational standards are not meant to replace individual job descriptions, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Food Inspection and Testing Engineer may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

Food Inspection and Testing Engineer is responsible for laboratory safety management, sampling management, sample management, and large-scale instrument and equipment management. It is also responsible for confirming testing methods and participating in external quality control to ensure the effectiveness of results. The Food Inspection and Testing Engineer performs mass spectrometry testing, pathogenic bacteria testing, generate reports, and review original records and testing reports. Usually, the Food Inspection and Testing Engineer performs the following responsibilities:

a) Sampling management

b) Sample management

c) Large instrument and equipment management

d) Mass spectrometry detection

e) Pathogenic bacteria detection

f) Record and report review

g) External inspection quality control

h) Confirmation of testing method

i) Laboratory safety management

The Occupational Standards have been clustered into NTA qualification levels i.e. NTA levels 7 and 8.

4.0 VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0 OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR FOOD INSPECTION AND TESTING ENGINEER- NTA LEVEL 4

Occupation	Food Inspection and Testing Engineer	**Occupation**	
Duties	ESTABLISH SAMPLING OPERATION COMPLIANCE	**Duty No.**	**701**
Tasks	MANAGE GENERAL SAMPLING OPERATIONS INSTRUCTIONS	**Task No.**	**7011**
Performance Criteria	The person performing this task must be able to manage general sampling operations instructions in accordance with approved sampling guidelines.		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Sampling plan 2. Sampling scheme 3. General rules for food sampling inspection 4. Measures for food safety sampling management 5. Computer 6. Safety and hygiene gear		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Prepare sampling plan and identify sampling plan requirements 2. Check the sampling nature 3. Prepare operation instruction objectives	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Control sampling plan 1.2. Implement sampling plan

4. Establish scope of application for operation instructions 5. Establish responsibilities for sampling process 6. Develop sampling procedures 7. Prepare sampling-related records 8. Observe health, occupational and environmental safety rules and regulations.	1.3 Prepare sampling operation instructions 1.4. Implement sampling **2.0 Principles** The person must be able to explain the principles of: 2.1 Random sampling 2.2 Sampling representativeness 2.3 Sampling typicality 2.4 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1 Sampling workflow and specific operations 3.2 Sampling methods for products in different fields 3.3 Sampling methods for different categories of products 3.4 Use of sampling tools 3.5 Transportation management methods for sampled products **4.0 Essential Skills** 4.1. Communication skills 4.2. Customer Service Skills 4.3. Management Skills 4.4. Summarizing ability 4.5 Computer application skills
Description on the End Product / Service	The sampling operations are managed according to approved standard sampling guidelines.
Circumstantial Knowledge:	**Detailed Knowledge About:**

	1. Occupational health and safety 2. Sampling techniques in food analysis 3. Food safety standards

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duty	ESTABLISH SAMPLING OPERATION COMPLIANCE	**Duty No.**	**701**
Task	DEVELOP FOOD SAFETY SAMPLING PLAN AND SCHEME	**Task No.**	**7012**
Performance Criteria	The person performing this task must be able to develop a food safety sampling plan and scheme according to the approved food safety sampling laws and regulations.		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Annual plan for superior food safety sampling inspection 2. Results of preliminary food safety testing 3. Quality control plan for products requiring special attention 4. Computer 5. Safety and hygiene gear		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Develop the purpose and indicators of sampling 2. Select high-risk samples as the key objects of the sampling plan 3. Determine the food varieties for sampling inspection 4. Develop sampling procedures, methods, quantity, and other requirements 5. Develop inspection items, inspection methods, and judgment	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Interpret laws, regulations, and related rules 1.2. Implement sampling requirements 1.3. Accumulate sampling experience 1.4. Summarize and analyze data **2.0 Principles** The person must be able to explain the principles of: 2.1. Sampling plan and scheme development 2.2 Product risk assessment standards 2.3 Food classification and product standards

criteria and other inspection requirements 6. Determine the submission method and time limit for sampling results and summary analysis 7. Observe health, occupational and environmental safety rules and regulations	2.4 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.5 Quality Management System (ISO 9001) **3.0 Theories** The person must be able to explain: 3.1. Classification and plan for sampling inspection 3.2. Different sampling methods: random sampling, stratified sampling, stratified random sampling, systematic sampling, etc. 3.3 Sampling by attributes and measurement inspection methods **4.0 Essential Skills** 4.1. Objective and rigorous work attitude 4.2. Ability to insight and control risks 4.3. Communication and contingency ability 4.4 Quick learning skills 4.5. Comprehensive analysis and processing skills
Description on the End Product / Service	The food safety sampling plan and scheme is developed according to the food safety sampling laws and regulations sampling
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational safety and health 2. Specifications for safe and standardized operation of equipment 3. Analytical chemistry 4. Testing laboratory management

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	ESTABLISH SAMPLING OPERATION COMPLIANCE	**Duty No.**	**701**
Tasks	MANAGE SAMPLING RISK ASSESSMENT	**Task No.**	**7013**
Performance Criteria	The person performing this task must be able to comprehensively evaluate the impact of the sampling process on the testing results based on quality risk management methods, determine measures to reduce corresponding risks according to the sampling risk assessment laws and regulations.		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Food safety risk monitoring plans at all levels 2. Sampling results of food safety testing 3. Sampling instruments and equipment 4. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Clarify the purpose of sampling risk assessment 2. Confirm the scope of sampling risk assessment 3. Clarify the key links of sampling risk assessment 4. Develop an implementation plan for sampling risk assessment	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Access to official data 1.2. Summarize and sort out data 1.3. Assess food safety risk points and degree of risk 1.4. Develop food safety risk prevention and control measures **2.0 Principles**

5. Implement the implementation plan for sampling risk assessment 6. Write a risk assessment report 7. Develop response measures for sampling risk assessment results 8 Observe health, occupational and environmental safety rules and regulations	The person must be able to explain the principles of: 2.1. Problem-oriented 2.2. Risk assessment 2.3. Science, openness, and impartiality 2.4. Integrity 2.5. Objectivity and rigor 2.6 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 3.2 Quality Management System (ISO 9001) **3.0 Theories** The person must be able to explain: 3.1. Risk assessment procedure 3.2 Sampling risk rating method **4.0 Essential Skills** 4.1 Data processing and analysis skills 4.2 Communication and contingency skill 4.3. Management skills 4.4 Ability to insight and control risks
Description on the End Product / Service	The sampling risk assessment managed according to the sampling risk assessment laws and regulations
Detailed knowledge:	**Detailed Knowledge About:** 1. Food safety laws and regulations 2. Food safety standards 3. Occupational health and safety 4. Food safety 5. Food safety and quality management 6. Mathematical statistics

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	ESTABLISH SAMPLE MANAGEMENT COMPLIANCE	**Duty No.**	**702**
Tasks	DEVELOP SAMPLE MANAGEMENT PROCEDURES	**Task No.**	**7021**
Performance Criteria	The person performing this task must be able to develop sample management program documents to standardize the activities of sample reception, preparation, transmission, preservation, and processingin accordance with the standard sample management procedures.		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required to perform the task: 1. Standard for laboratory sample management 2. Laboratory quality manual 3. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Develop the purpose, scope of application and responsibilities of developing procedures 2. Develop procedures for receiving and registering samples 3. Develop sample identification and circulation procedures 4. Develop procedures for sample preparation 5. Develop procedures for sample preservation and processing 6. Develop management process for keeping and preparation of samples	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Accumulate knowledge of sample management 1.2. Possess sample management capabilities 1.3. Interpret sample management standards 1.4. Develop sample management documents **2.0 Principles** The person must be able to explain the principles of: 2.1. Sample management 2.2. Integrity 2.3. Objectivity and rigor 2.4. Science, openness, and impartiality

7. Observe health, occupational and environmental safety rules and regulations	2.5 Specification for compilation of sample management procedures **3.0 Theories** The person must be able to explain: 3.1. Good Laboratory Practice (GLP) 3.2. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 3.3. Laboratory sample management methods **4.0 Essential Skills** 4.1. Document writing skills 4.2. Management skills 4.3. Ability to analyze and summarize data 4.4. Good speaking skills 4.5 Computer application skills
Description on the End Product / Service	The sample management procedures are developed according to the standard sample management procedures.
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Testing laboratory management

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	ESTABLISH SAMPLE MANAGEMENT COMPLIANCE	**Duty No.**	**702**
Tasks	DEVELOP SAMPLE PREPARATION OPERATION INSTRUCTIONS	**Task No.**	**7022**
Performance Criteria	The person performing this task must be able to develop sample preparation operation instructions, standardize sample preparation activities in accordance with the standard sample management procedures.		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Assignment for testing tasks 4. Sample management procedures 5. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Develop specific requirements for sample preparation in terms of testing task assignment, product standards, and method standards 2. List the purpose of developing the operation instructions 4. Specify the scope of application for operation instructions 4. Develop overall requirements and reference basis for sample	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Prepare different food samples 1.2. Prepare items in the sample preparation operation instructions and form a guidance document **2.0 Principles** The person must be able to explain the principles of: 2.1 Specifications for developing sample preparation operation instructions 2.2 Product execution standards 2.3 Testing method standards

5. Standardize the preparation methods for different types of samples and different testing items 6. Develop response plans for special situations 7. List normative references 8. Confirm relevant record formats 9. Confirm relevant appendixes 10. Observe health, occupational and environmental safety rules and regulations	**3.0 Theories** The person must be able to explain: 3.1. Good Hygiene Practices (GHP) 3.2. Good Manufacturing Practice (GMP) 3.3. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 3.4. Sample pretreatment technology 3.5. Laboratory and test samples 3.5 Food sample preparation method 3.6 Reasons and solutions for sample contamination 3.7 Reasons and solutions for the loss of sample components **4.0 Essential Skills** 4.1 Ability to insight and control risks 4.2 Communication and contingency ability
Description on the End Product / Service	The sample preparation operation instructions are developed according to the standard sample preparation operation procedures.
Detailed knowledge:	**Detailed Knowledge About:** 1. Laboratory safety operation methods 2. Instrument and equipment safety operating procedures 3. Occupational health and safety 4. Testing laboratory management

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	ESTABLISH SAMPLE MANAGEMENT COMPLIANCE	**Duty No.**	**702**
Tasks	DEVELOP SAMPLING MANAGEMENT OPERATION INSTRUCTIONS	**Task No.**	**7023**
Performance Criteria	The person performing this task must be able to develop sampling management operation instructions in accordance with the approved sample management procedures.		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Sample management procedures 4. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Develop the purpose of sampling management operation instructions 2. Develop the scope of application of sample management operation instructions 3. Develop the responsibilities of the sample management functional department 4. Develop on-site numbering, sample reception, and sample identification processes for sample management procedures	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Properly manage general samples 1.2. Properly manage kept samples 1.3. Properly manage retest samples **2.0 Principles** The person must be able to explain the principles of: 2.1 Preparation of sample management operation instructions 2.2 Good Laboratory Practice (GLP) 2.3 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025)

5. Develop sample storage and preparation processes in the sample management process 6. Develop the sample receiving and return process in the sample management process 7. Develop sample keeping and disposal processes in the sample management process 8. Develop a sample data storage process 9. Observe health, occupational and environmental safety rules and regulations	**3.0 Theories** The person must be able to explain: 3.1. Purpose of sample management 3.2. Job requirements for sample manager 3.3 Requirements for sample reception, identification, warehousing, and circulation 3.4. Sample preparation requirements 3.5. Sample storage requirements 3.6. Sample data storage requirements 3.7. Management procedure for inspection items and articles 3.8 Control procedure for facility and environmental condition **4.0 Essential Skills** 4.1. Management skills 4.2 Communication and contingency ability 4.3. Ability to summarize
Description on the End Product / Service	The sampling management operation instructions are developed according to the standard sample management procedures.
Detailed knowledge:	**Detailed Knowledge About:** 1. Basic operating regulations for laboratory safety 2. Occupational health and safety 3. Testing laboratory management 4. Disposal of laboratory waste 5. Testing laboratory management

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duty	CONDUCT LARGE INSTRUMENTS AND EQUIPMENT MANAGEMENT	**Duty No.**	**703**
Tasks	SUPERVISE THE PROCUREMENT OF LARGE INSTRUMENTS AND EQUIPMENT	**Task No.**	**7031**
Performance Criteria	The person performing this task must be able to supervise the purchasing and delivery logistics of large instruments and equipment in accordance with the prescribed requirements of the management standards.		
Range Statement	This task may be carried out in the laboratory and testing workshop under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Equipment procurement and acceptance procedure report 2. Related large instruments and accessories: chromatography, spectroscopy, and mass spectrometers, fully automated microbial identification instruments, etc. 3. Materials required for the experiment: reagents, volumetric flask, pipettes, volumetric flask, filter paper, etc. 4. Laboratory safety protection equipment: fume hood, secondary biological laboratory, Class 100 clean laboratory, etc. 5. Personal Protective Equipment (PPE) : goggles, gloves, work clothes, etc. 6. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task 2. Submit the application report for the purchase of large instruments and	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Make research on equipment model 1.2. Execute procurement procedures 1.3. Perform visual inspection of equipment

equipment according to the requirements 3. Carry out market research and selection of proposed equipment 4. Participate in the expert demonstration of large precision instruments and equipment 5. Supervise the procurement of the large instruments and equipment according to the plan 6. Prepare the installation conditions for large instruments 7. Check the appearance, model and accessory list of the incoming instruments 8. Organize technical acceptance of instruments 9. Submit the acceptance report to the equipment supervisor 10. Dispose of wastes 11. Clean tools, equipment and workplace	1.4. Perform technical acceptance of equipment **2.0 Principles** The person must be able to explain the principles of: 2.1. Equipment procurement 2.2 Acceptance of instruments and equipment 2.3 Operating procedures for large instruments and equipment 2.4 Good Laboratory Practice (GLP) 2.5 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1. Principles and applications of large instrument analysis 3.2. Maintenance and management of instruments and equipment 3.3. Technical acceptance of equipment core indicators 3.4. Reasons and solutions for the deviation of technical indicators of instruments and equipment **4.0 Essential Skills** 4.1. Communication and understanding ability 4.2. Market research skills 4.3 Teamwork skills 4.4 Data processing and analysis skills 4.5 Report writing skills
Description on the End Product / Service	The procurement and acceptance of Large instruments and equipment is conducted according to approved management standards.

Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operating regulations for laboratory safety 3. Instrument and equipment safety operating procedures 4. Testing laboratory management 5. Disposal of laboratory wastes

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	CONDUCT LARGE INSTRUMENTS AND EQUIPMENT MANAGEMENT	**Duty No.**	**703**
Tasks	CARRY OUT METROLOGICAL TRACEABILITY AND INTERMEDIATE CHECK OF LARGE INSTRUMENTS AND EQUIPMENT	**Task No.**	**7032**
Performance Criteria	The person performing this task must be able to perform quantity traceability and intermediate check on large instruments and equipment in accordance with the standard requirements of the measurement traceability control procedures and intermediate check procedures		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer.5 The following equipment and tools will be required in performing the task: 1. Instrument and equipment operating manual 2. Operation instructions for intermediate check of instruments and equipment 3. Related large instruments and accessories: chromatography, spectroscopy, and mass spectrometers, fully automated microbial identification instruments, etc. 4. Materials required for the experiment: reagents, volumetric flask, pipettes, volumetric flask, filter paper, etc. 5. Laboratory safety protective equipment: fume hood, secondary biological laboratory, Class 100 clean laboratory, etc. 6. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 7. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following:	**Detailed Knowledge About:** **1.0 Methods**

1. Take occupational health and safety precautions when performing the task 2. List the large equipment used for testing/calibration, and prepare the metrological traceability plan of the equipment 3. Determine equipment calibration parameters 4. Confirm the results of the metrological traceability on the verification/calibration certificate 5. Provide metrological confirmation labels in prominent locations 6. Evaluate the status of large instruments and equipment, and prepare a plan for equipment intermediate check 7. Check during implementation and make records 8. Evaluate and process the results of intermediate check 9. Dispose of wastes 10. Clean tools, equipment and workplace	The person performing this task must be able to explain how to: 1.1. Develop a metrological traceability plan for equipment 1.2. Prepare the intermediate check plan of equipment 1.3. Confirm verification/calibration results 1.4. Conduct intermediate check 1.5. Assess the results of intermediate check **2.0 Principles** The person must be able to explain the principles of: 2.1. Check of large instruments and equipment 2.2. Metrological traceability 2.3 Good Laboratory Practice (GLP) 2.4 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.5 Quality Management System (ISO 9001) **3.0 Theories** The person must be able to explain: 3.1. Metrological traceability procedure and intermediate check procedure 3.2. International Vocabulary of Metrology (ISO/IEC Guide 99) 3.3. Basic knowledge of measurement 3.4. Theory of intermediate check of instruments 3.5. Measurement error theory 3.6. Knowledge of metrological traceability **4.0 Essential Skills** 4.1 Ability to identify and solve problems 4.2 Communication skills 4.3 Data processing and analysis skills

	4.4 Quick learning skills 4.5. Writing skills 4.6 Computer application skills
Description on the End Product / Service	The metrological traceability and intermediate check is carried out in accordance with the performance requirements of instruments
Detailed knowledge:	Detailed Knowledge About: 1. Occupational health and safety 2. Basic operating regulations for laboratory safety 3. Instrument analysis 4. Testing laboratory management 5. Disposal of laboratory wastes

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duty	CONDUCT LARGE INSTRUMENTS AND EQUIPMENT MANAGEMENT	**Duty No.**	**703**
Task	CARRY OUT MAINTENANCE OF LARGE INSTRUMENTS AND EQUIPMENT	**Task No.**	**7033**
Performance Criteria	The person performing this task must be able to do the maintenance and take precaution measure of large instruments and equipment in accordance with the requirements of the management procedures for large instruments and equipment		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Instrument and equipment usage management procedures 2. Instrument operating manual 3. Related large instruments and equipment: chromatography, spectroscopy, and mass spectrometers, fully automated microbial identification instruments, etc. 4. Materials required for the experiment: reagents, volumetric flask, pipettes, volumetric flask, filter paper, etc. 5. Laboratory safety protective equipment: fume hood, secondary biological laboratory, Class 100 clean laboratory, etc. 6. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 7. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following:	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to:

1. Take occupational health and safety precautions when performing the task 2. Establish technical archives for large instruments and equipment 3. Establish operating procedures for large instruments and equipment 4. Make instrument and equipment status labels 5. Develop a maintenance plan for instruments and equipment 6. Maintain instruments and equipment and make records 7. Maintain high-performance liquid chromatography solvent delivery pump; Maintain the UV visible detector, perform daily maintenance and troubleshooting on the workstation; Maintain the high performance liquid chromatography solvent delivery pump; Maintain the UV visible detector and perform daily maintenance and troubleshooting on the workstation 8. Repair or report according to the fault situation 9. Apply for scrapping of large instruments and equipment that cannot meet experimental requirements 10. Implement scrapping and update archives of equipment in use	1.1. Manage large instruments and equipment 1.2. Maintain large instruments and equipment 1.3. Troubleshoot large instrument and equipment 1.4. Scrap instruments and equipment **2.0 Principles** The person must be able to explain the principles of: 2.1. Specification for safe operation of instruments and equipment 2.2 Equipment management 2.3 Good Laboratory Practice (GLP) 2.4 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1. Common faults and troubleshooting methods of high-performance liquid chromatography 3.2 Common faults and troubleshooting methods of gas chromatography 3.3. Operating principles and application regulations of large instruments 3.4. Knowledge of instrument and equipment management in testing laboratories 3.5. Knowledge of using and maintaining large instruments 3.6 Instrument management and maintenance methods 3.7 Instrument troubleshooting methods 3.8. Common faults and troubleshooting methods of high-performance liquid chromatography

11. Dispose of wastes 12. Clean tools, equipment and workplace	3.9 Common faults and troubleshooting methods of gas chromatography **4.0 Essential Skills** 4.1. Communication skills 4.2. Computer skills 4.3. Continuous learning ability 4.4. Emergency response capability
Description on the End Product / Service	The maintenance of large instruments and equipment is carried out according to the requirements of the standard procedures for large instruments and equipment
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operation for laboratory safety 3. Instrument analysis 4. Testing laboratory management 5. Disposal of laboratory waste

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	CONDUCT LARGE INSTRUMENTS AND EQUIPMENT MANAGEMENT	**Duty No.**	**703**
Tasks	MANAGE THE PROPER OPERATIONS OF LARGE INSTRUMENTS AND EQUIPMENT	**Task No.**	**7034**
Performance Criteria	The person performing this task must be able to manage the proper operations of large instruments and equipment through strict supervision and staff trainings on the same in accordance with the standard procedures for large instruments and equipment		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Instrument and equipment operating procedures 2. Instrument operating manual 3. Relevant instruments and equipment: chromatographic, spectral and mass spectrometric instruments, filtration devices, solid phase extraction devices, rotary evaporator, termovap sample concentrator, etc. 4. Reagent consumables required for experiment: reagents, filtrating membranes, sample bottles, pipettes, volumetric flask, etc. 5. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 6. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task 2. Conduct stringent training on the proper instrument and equipment	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Operate large instruments and equipment 1.2. Train on the use of instruments and equipment

operations 3. authorize the use of large instruments and equipment 4. Use instruments and equipment according to operating procedures 5. Make records for use of large instruments and equipment 6. Conduct safety checks on instruments and equipment before and after use 7. Participate in continuing education training on instruments and equipment 8. Provide equipment operation training for other employees 9. Dispose of wastes 10. Clean tools, equipment and workplace	**2.0 Principles** The person must be able to explain the principles of: 2.1 Good Laboratory Practice (GLP) 2.2 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.3. Similarity and compatibility 2.4 Selection of mobile and stationary phases in liquid chromatography 2.5 Selection of stationary liquids for gas chromatography **3.0 Theories** The person must be able to explain: 3.1. Working principles and applications of large instrument 3.5. Knowledge of using and maintaining large instruments 3.3. Knowledge of food inspection and testing 3.4. Error analysis theory 3.5. Knowledge of instrument and equipment management in testing laboratories 3.6 Basic theory of chromatography 3.7 Plate theory 3.8 Rate theory 3.9 Principles of chromatographic determination and quantification **4.0 Essential Skills** 4.1 Chart data processing ability 4.2. Ability to analyze data results 4.3 Ability to solve problems 4.4. Continuous learning ability

	4.5. Speaking skills **5.0 Math skills** 5.1. Mathematical statistics skills
Description on the End Product / Service	The proper operations of large instruments and equipment is managed according to the standard operating procedures of each instrument/equipment.
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operating regulations for laboratory safety 3. Instrument and equipment safety operating procedures 4. Instrument analysis 5. Testing laboratory management 6. Disposal of laboratory wastes

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	PERFORM MASS SPECTROMETRY DETECTION	**Duty No.**	**704**
Tasks	CARRY OUT MASS SPECTROMETRY ANALYSIS	**Task No.**	**7041**
Performance Criteria	The person performing this task must be able to use mass spectrometer for food testing and analysis in accordance with the mass spectrophotometry inspection and testing specifications		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Testing standard 2. Operating manual for mass spectrometer 3. Relevant instruments and equipment: LC-MS instrument, GC-MS instrument, inductively coupled plasma mass spectrometer, analytical balance, filtrating device, solid phase extraction device, rotary evaporator, termovap sample concentrator, microwave digestion instrument, water purifier, etc. 4. Consumables required for experiment: reagents, filtrating membranes, sample bottles, pipettes, volumetric flask, etc. 5. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 6. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Handle complex samples 1.2. Design quality control experiments

2. Study the operating principles of mass spectrometer 3. Preparare reagents and do sample pre-treatment 4. Operate the mass spectrometer according to its operating procedures 5. Optimize the parameters setting of mass spectrometer 6. Design and process standard samples, blank samples, and quality control samples, and establish relevant injection sequences 7. Determine mass spectrometes for the measured food samples 8. Carry out the qualitative and quantitative analysis of mass spectrum 9. Compile the experimental records 10. Submit the test result report to the supervisor 11. Dispose of wastes 12. Clean tools, equipment and workplace	1.3. Operate mass spectrometer 1.4. Analyze mass spectrum and process data 1.5. Report mass spectrometry results **2.0 Principles** The person must be able to explain the principles of: 2.1. Scientific and rigorous 2.2. Qualitative and quantitative of mass spectrometry 2.3 Good Laboratory Practice (GLP) 2.4 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1. Principles and applications of mass spectrometer 3.2 Knowledge of mass spectrometry structure, operation, and spectral analysis 3.3 Qualitative and quantitative of mass spectrometry 3.4 Relevant knowledge of analytical chemistry 3.5 Knowledge of data analysis and processing **4.0 Essential Skills** 4.1 Instrument maintenance and troubleshooting capabilities 4.2. Ability to analyze data results 4.3 Ability to find and solve problems 4.4. Continuous learning ability **5.0 Math skills** 5.1 Significant figures and operation rules
Description on the End Product / Service	The mass spectrometry analysis for food analysis is carried out in accordance with spectrometry inspection and testing specifications

Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operating regulations for laboratory safety 3. Instrument and equipment safety operating procedures 4. Instrument analysis 5. Testing laboratory management 6. Disposal of laboratory waste

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	PERFORM MASS SPECTROMETRY DETECTION	**Duty No.**	**704**
Tasks	CONDUCT THE IMPROVEMENT AND OPTIMIZATION OF MASS SPECTROMETRY MONITORING METHODS	**Task No.**	**7042**
Performance Criteria	The person performing this task must be able to improve and optimize the spectrometry testing technique in accordance with the mass spectrophotometry inspection and testing specifications		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Testing method validation procedures 2. Instrument operating manual 3. Relevant instruments and equipment: chromatographic spectrometer, mass spectrometer, analytical balance, filtrating device, solid phase extraction device, rotary evaporator, termovap sample concentrator, microwave digestion instrument, water purifier, etc. 4. Consumables required for experiment: reagents, filtrating membranes, sample bottles, pipettes, volumetric flask, etc. 5. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 6. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Develop an optimized testing plan

2. Consult the existing detection methods and references 3. Identify the proper approach for spectrometry optimization plans 4. Conduct experiments on optimized detection methods 5. Conduct methodological validation 6. Evaluate the uncertainty of the new method 7. Write an experimental report on method optimization 8. Dispose of wastes 9. Clean tools, equipment and workplace	1.2. Verify the feasibility and effectiveness of detection methods 1.3. Evaluate method uncertainty **2.0 Principles** The person must be able to explain the principles of: 2.1. Mass spectrometry detection specifications 2.2. Qualitative of mass spectrometry **3.0 Theories** The person must be able to explain: 3.1. Good Laboratory Practice (GLP) 3.2. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 3.3. Knowledge of food chemistry 3.4 Knowledge of analytical chemistry 3.5. Sample pretreatment knowledge 3.6. Knowledge of large instrument analysis 3.7. Methodology validation knowledge 3.8. Knowledge of error theory 3.9. Data analysis and processing methods **4.0 Essential Skills** 4.1. Literature search capability 4.2. Ability to analyze data results 4.3 Ability to find and solve problems 4.4. Continuous learning ability 4.5 Report writing skills **5.0 Essential Skills** 5.1 Significant figures and operation rules

Description on the End Product / Service	The improvement and optimization of mass spectrometry monitoring methods is conducted in accordance with the mass spectrophotometry inspection and testing specifications
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operating regulations for laboratory safety 3. Instrument and equipment safety operating procedures 4. Testing laboratory management 5. Disposal of laboratory wastes

n	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	PERFORM MASS SPECTROMETRY DETECTION	**Duty No.**	**704**
Tasks	MANAGE ABNORMAL MASS SPECTROMETER DATA THROUGH RETESTING.	**Task No.**	**7043**
Performance Criteria	The person performing this task must be able to manage abnormal mass spectrometer data and conduct retesting in accordance with the regulatory requirements of the testing result management procedures		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Test result management procedures 2. Instrument operating manual 3. Relevant instruments and equipment: chromatographic spectrometer, mass spectrometer, analytical balance, filtrating device, solid phase extraction device, rotary evaporator, termovap sample concentrator, microwave digestion instrument, water purifier, etc. 4. Consumables required for experiment: reagents, filtrating membranes, sample bottles, pipettes, volumetric flask, etc. 5. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 6. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task 2. Identify abnormal data	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Analyze abnormal values of test results 1.2. Retest the non-conforming items of samples

3. Analyze the causes of anomalies 4. Exclude whether it is caused by laboratory deviation 5. Exclude sampling anomalies 6. Resample and retest nonconformities 7. conduct retesting by another person when there is inconsistency in the retest results 8. Determine the results according to the judgment rules 9. Dispose of wastes 10. Clean tools, equipment and workplace	1.3. Determine the results **2.0 Principles** The person must be able to explain the principles of: 2.1. Testing specifications 2.2. Validity of results 2.3 Good Laboratory Practice (GLP) 3.2. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1 Food analysis theory 3.2. Principles of instrument analysis 3.3. Error analysis 3.4. Data analysis and processing **4.0 Essential Skills** 4.1. Ability to analyze data results 4.2 Ability to find and solve problems 4.3. Continuous learning ability 4.4. Critical thinking 4.5. Communication skills
Description on the End Product / Service	The abnormal mass spectrometry data is managed through retesting in accordance with the regulatory requirements of the testing result management procedures
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operation for laboratory safety 3. Instrument and equipment safety operation 4. Knowledge of instrument analysis

	5. Basic knowledge of analytical chemistry 6. Knowledge of testing laboratory management 7. Disposal of laboratory wastes

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duty	CONDUCT PATHOGENIC BACTERIA DETECTION	**Duty No.**	**705**
Task	CARRY OUT THE DETECTION OF COMMON PATHOGENIC BACTERIA (STAPHYLOCOCCUS AUREUS, SALMONELLA, LISTERIA MONOCYTOGENES, ETC.)	**Task No.**	**7051**
Performance Criteria:	The person performing this task must be able to carry out the detection of common pathogenic bacteria in accordance with the inspection and testing regulations, standards, and biosafety requirements.		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Testing method operation instructions 2. Laboratory safety protective equipment: biosafety laboratory, etc. 3. Relevant instruments and equipment: refrigerator, ultra clean workbench, biosafety cabinet, incubator, autoclave, thermostatic incubator, microscope, homogenizer, oscillator, etc. 4. Materials required for the experiment: alcohol burner, scissors, tweezers, sterilized alcohol, petri dish, straw, pipette, inoculating loop, conical flask, etc. 5. Personal Protective Equipment (PPE): goggles, sterile laboratory coat, hats, gloves, masks, shoe covers, etc. 6. Corresponding standard strains 7. Computer		

Evidence Requirements	
Actual performance	**Underpinning Knowledge**
The person performing this task must be able to do the following:	**Detailed Knowledge About:** **1.0Methods**

1. Take occupational health and safety precautions when performing the task 2. Determine the method for pathogenic bacteria testing 3. Undergo operation training and job authorization for microbiological testing equipment 4. Ensure the presence of environmental monitoring and confirmation of microbial laboratory 5. Prepare equipment, consumables, and utensils for pathogen testing 6. Prepare culture media and reagents for pathogenic bacteria testing 7. Perform sterilization and inspection of sterile items 8. Conduct aseptic treatment of samples according to standards and specifications 9. Conduct pathogenic bacteria testing operations such as enrichment, isolation, and identification in accordance with standards and specifications 10. Use large equipment to identify positive or complex samples 11. Conduct result observation and analysis, and prepare and plan for the next experiment 12. Conduct data processing and make records 13. Deactivate the culture	The person performing this task must be able to explain how to: 1.1. Prepare sterile materials 1.2. Process sample, enrich, separate and identify 1.3. Observe phenomena and analyze results 1.4. Determine result **2.0 Principles** The person must be able to explain the principles of: 2.1. Sterile operation 2.2 Random sampling 2.3. Data rounding 2.4 Good Laboratory Practice (GLP) 2.5 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.6. Biosafety guidelines for microbiology and biomedical laboratories 2.7. Laboratory biosafety guidelines 2.8. General principles for microbiological testing of food **3.0 Theories** The person must be able to explain: 3.1. Basic theory of pathogenic bacteria testing 3.2. Fundamentals of special equipment pressure vessel operation 3.3 Knowledge of microbial testing 3.4. Knowledge of standard strain management **4.0 Essential Skills** 4.1 Data processing and analysis skills 4.2 Communication skills 4.3. Report preparation skills

14. Dispose of wastes and surplus samples 15. Instrument restoration and maintenance 16. Clean tools, equipment and workplace	4.4 Report writing skills 4.5 Computer application skills
Description on the End Product / Service	The detection of common pathogenic bacteria is carried out in accordance with the inspection and testing regulations, standards, and biosafety requirements
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operating regulations for bio-safety 2. Equipment safety regulations and operating methods 4. Disposal of wastes in microbiology laboratory

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duty	PERFORM ATHOGENIC BACTERIA DETECTION	**Duty No.**	**705**
Task	CONTROL THE QUALITY OF CULTURE MEDIUM	**Task No.**	**7052**
Performance Criteria:	The person performing this task must be able to inspect and control the culture medium in accordance with the culture medium acceptance standards and quality control procedures		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Acceptance and quality control procedures of culture medium 2. Computer 3. Instrument operating manual 4. Relevant instruments and equipment: refrigerator, ultra clean workbench, biosafety cabinet, incubator, autoclave, thermostatic incubator, microscope, homogenizer, oscillator, computer, etc. 5. Materials required for the experiment: alcohol burner, scissors, tweezers, sterilized alcohol, petri dish, straw, pipette, inoculating loop, conical flask, etc. 6. Personal Protective Equipment (PPE): sterile laboratory coat, hats, gloves, masks, shoe covers, etc. 7. Corresponding standard strains		

Evidence Requirements	
Actual performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Perform culture medium acceptance 1.2. Control the culture medium

2. Determine acceptance or quality control objects and quality requirements 3. Identify the method for the performance testing of culture medium and reagents 4. Prepare equipment, consumables, and appliances required for acceptance or quality control 5. Prepare culture media and reagents for pathogenic bacteria testing and conduct sterility test 6. Conduct quality control on preservation and use of strains 7. Determine the quantitative, semi quantitative, and qualitative growth rate, selectivity, and specificity of the culture medium according to standards and specifications 8. Observe and analyze the results 9. Record test results 10. Deactivate the culture 11. Clean tools, equipment and workplace	**2.0 Principles** The person must be able to explain the principles of: 2.1. Sterile operation 2.2 Random sampling 2.3 Quality requirements and standards for culture medium and reagents 2.4. Traceability 2.5 Good Laboratory Practice (GLP) 2.6 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.7 Biosafety guidelines for microbiology and biomedical laboratories 2.8 Laboratory biosafety manual 2.9 General principles for microbiological testing of food **3.0 Theories** The person must be able to explain: 3.1. Fundamentals of special equipment pressure vessel operation 3.2 Acceptance and quality control of culture medium 3.3 Microbiological test procedure **4.0 Essential Skills** 4.1 Data processing and analysis skills 4.2 Communication skills 4.3. Customer service skills 4.4. Report preparation skills 4.5. Computer application skills
Description on the End Product / Service	The culture medium quality is controlled in accordance with the culture medium acceptance standards and quality control proceduress

Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operation for bio-safety 2. Standardized operation of equipment safety 4. Microbiological testing 5. Training and acceptance standards 6. Disposal of wastes in microbiology laboratory

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	ESTABLISH THE COMPLIANCE IN THE TESTING RECORDS AND REPORTS	**Duty No.**	**706**
Tasks	REVIEW THE EXISTING TESTING RECORDS AND REPORTS	**Task No.**	**7061**
Performance Criteria	The person performing this task must be able to review the original testing records and testing reports in accordance with testing standard specifications.		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Original testing record 2. Testing report 3. Product execution standard 4. Standard for testing methods 5. Sampling form/commission form 6. Standard for report/certificate preparation 7. Computer 8. Safety and hygiene gear		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Verify the correctness of the testing report template selected 2. Check the consistency and traceability of information 3. Verify the applicability and effectiveness of standards	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Prepare original records and testing reports 1.2. Analyze food related standards 1.3. Test food related items 1.4. Check testing items

4. Verify the standardization of records 5. Confirm the accuracy of data calculation and rounding 6. Discover abnormal data 7. Confirm the completeness of necessary information in original records and reports 8. Observe health, occupational and environmental safety rules and regulations	1.5. Record necessary information for original records and testing reports **2.0 Principles** The person must be able to explain the principles of: 2.1. Principles and requirements for making original records 2.2. Principles and requirements for writing food inspection and testing reports, Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.3 Quality Management System (ISO 9001) 2.4 Food safety laws and regulations **3.0 Theories** The person must be able to explain: 3.1. Knowledge of testing laboratory management 3.2. Compilation procedures for original records and testing reports 3.3. Rounding off theory of significant figures **4.0 Essential Skills** 4.1 Communication and contingency ability 4.2. Accountability and patience 4.3. Teamwork skills 4.4 Management capabilities 4.5. Summarizing ability 4.6 Computer application skills
Description on the End Product / Service	Existing testing records and reports are reviewed in accordance with the testing standards and specifications.
Detailed knowledge:	**Detailed Knowledge About:** 1. Laboratory safety operation methods 3. Instrument and equipment safety operation 3. Occupational health and safety

	4. Common technical specifications for food inspection 5. International system of units and its application

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	ESTABLISH THE COMPLIANCE IN TESTING RECORDS AND REPORTS	**Duty No.**	**706**
Tasks	VALIDATE THE CONFORMITY OF THE DATA ANALYSIS	**Task No.**	**7062**
Performance Criteria	The person performing this task must be able to validate the conformity of the data analysis according to standard data analysis procedures and specifications.		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Original testing record 4. Task assignment 5. Uncertainty report 6. Computer 7. Safety and hygiene gear		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Verify the correctness of the sampling form 2. Confirm that the sample preparation meets the requirements of the testing method 3. Check the compatibility between inspection methods and judgment standards	**Detailed Knowledge About:** **1.0Methods** The person performing this task must be able to explain how to: 1.1. Perform sampling 1.2. Prepare samples 1.3. Test samples 1.4. Design quality control methods 1.5. Issue reports 1.6. Analyze test results 1.7. Determine test results

4. Analyze the effectiveness of testing results through quality control results 5. Analyze the reasonableness of judgment basis application 6. Confirm the uncertainty of the test results for critical value and the agreement on conformity assessment in the test contract 7. Confirm the correspondence between the single test conclusion and the report conclusion 8. Confirm the standardization of the testing conclusion format 9. Confirm the consistency between the testing conclusion and the requirements of the task assignment 10. Observe health, occupational and environmental safety rules and regulations	**2.0Principles** The person must be able to explain the principles of: 2.1. Compatibility between testing methods and judgment standards 2.2. Correspondence between the single test conclusion and the report conclusion 2.3. Confidentiality of testing results and conclusions 2.4. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.5 Quality Management System (ISO 9001) 2.6 Product execution standards 2.7 Testing method standards 2.8 Food safety laws and regulations **3.0 Theories** The person must be able to explain: 3.1 Knowledge of testing laboratory management 3.2. Measurement method for uncertainty of inspection results 3.3. Contract review 3.4. Product standards **4.0 Essential Skills** 4.1 Communication ability 4.2. Teamwork skills 4.3 Management capabilities 4.4. Summarizing ability 4.5 Computer application skills
Description on the End Product / Service	The conformity of data analysis is validated according to approved standard data analysis procedures and specifications
Detailed knowledge:	**Detailed Knowledge About:**

	1. Basic operating regulations for laboratory safety 2. Safe and standardized operation of equipment 3. Food quality and safety 4. Testing laboratory management 5. Occupational health and safety

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	TEST THE QUALITY CONTROL USING EXTERNAL AGENTS	**Duty No.**	**707**
Tasks	EVALUATE THE UNCERTAINTY OF THE TESTING METHOD	**Task No.**	**7071**
Performance Criteria	The person performing this task shall be able to analyze and evaluate the measurement uncertainty in the testing process according to the relevant testing methods under the supervision of senior food inspection and testing engineers		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Testing method operation instructions 2. Testing consumables, instruments and equipment: pipette, filter membrane, sample bottle, electronic balance, chromatograph, spectrometer, solid-phase extraction device, etc. 3. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 4. Computer		
Evidence Requirements			
Practical Performance		**Underpinning Knowledge**	

The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task 2. Determine the standard operating procedures for testing items and specify the measurements to be taken 3. Conduct inspection according to standard procedures 4. Establish a mathematical model based on the testing procedures 5. Identify the source of measurement uncertainty in the testing process 6. Quantify the uncertainty components based on different statistical models 7. Calculate the combined uncertainty 8. Report uncertainty 9. Evaluate uncertainty 10. Dispose of wastes 11. Clean tools, equipment and workplace	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Evaluate testing uncertainty measured 1.2. Identify the source of testing uncertainty 1.3. Quantify the uncertainty components 1.4. Evaluate measurement uncertainty **2.0 Principles** The person must be able to explain the principles of: 2.1 Good Laboratory Practice (GLP) 2.2. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1 Guide to the Expression of Uncertainty in Measurement (ISO/IEC Guide 98-3) 3.2. International Vocabulary of Metrology (ISO/IEC Guide 99) 3.3. Knowledge of food inspection and testing 3.4. Analysis of the source of measurement uncertainty in testing 3.5. Evaluation method for measurement uncertainty **4.0 Essential Skills** 4.5. Computer application skills 4.2. Data processing and analysis skills 4.3. Communication skills

	4.4. Customer service skills 4.5. Report writing skills **5.0. Math skills** 5.1. Mathematical statistics skills
Description on the End Product / Service	The uncertainty of a testing method is evaluated as per approved standards and specifications.
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operation for laboratory safety 3. Specifications for safe and standardized operation of equipment 4. Analytical chemistry 5. Testing laboratory management 6. Disposal of laboratory waste

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	TEST THE QUALITY CONTROL PROCESS USING EXTERNAL AGENTS	**Duty No.**	**707**
Tasks	PARTICIPATE IN EXTERNAL QUALITY CONTROL ACTIVITIES	**Task No.**	**7072**
Performance Criteria	The person performing this task must be able to participate in external quality control under the supervision of a senior food inspection and testing engineer, in accordance with relevant laboratory procedures and quality control plans. .		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. External quality control plan 2. Operation procedure for testing method 3. Operation instructions for external quality control items 4. Testing reagents and consumables, instruments and equipment: pipette, filter membrane, sample bottle, electronic balance, chromatograph, spectrometer, solid-phase extraction device, etc. 5. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 6. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Take occupational health and safety precautions when performing the task	**Detailed Knowledge About:** **1.0Methods** The person performing this task must be able to explain how to: 1.1. Perform competency verification 1.2. Conduct measurement audits 1.3. Perform inter laboratory comparisons

2. Complete external quality control item testing according to standard testing procedures 3. Design a quality control plan to ensure the effectiveness of testing results 4. Submit the report of external quality control testing results 5. Follow up processing of external quality control results 6. Dispose of wastes 7. Clean tools, equipment and workplace	1.4. Conduct on-site labeling or blind sample assessment 1.5. Follow up external quality control results **2.0 Principles** The person must be able to explain the principles of: 2.1 Good Laboratory Practice (GLP) 2.2 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1. Knowledge of food inspection and testing 3.2. Methods to ensure the effectiveness of results 3.3. Competency verification 3.4. Measurement audits 3.5. Inter laboratory comparisons **4.0 Essential Skills** 4.1. Testing skills 4.2. Experiment design skills 4.3. Data processing and analysis skills 4.4. Report preparation skills 4.5. Communication skills **5.0. Math skills** 5.1. Mathematical statistics skills
Description on the End Product / Service	Participation in external quality control activities is carried out in accordance with relevant laboratory procedures and quality control plans .

Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operation for laboratory safety 3. Specifications for safe and standardized operation of instruments 4. Analytical chemistry 5. Testing laboratory management 6. Disposal of laboratory waste

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	TEST THE QUALITY CONTROL PROCESS USING THE EXTERNAL AGENTS	**Duty No.**	**707**
Tasks	CONDUCT INTERNAL AUDITS	**Task No.**	**7073**
Performance Criteria	The person performing this task must be able to conduct internal audits of the testing laboratory according to the laboratory management system and internal audit plan under the supervision of a senior food inspection and testing engineer, to ensure the effective implementation and maintenance of the management system		
Range Statement	This task may be carried out in a food testing laboratory and office under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Document for laboratory management system 2. Laboratory internal audit scheme and plan 3. Checklist for evaluating management system elements 4. Internal audit process record form: Non-conformance record form, corrective action record form, etc. 5. Laboratory quality records 6. Laboratory technical records 7. Laboratory equipment and consumables 8. Safety and hygiene gear		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Understand the management system document	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to:

2. Consult materials to identify key points of internal audit 3. Prepare an internal audit checklist 4. Prepare an internal audit process record form 5. Conduct internal audits on the collection of evidence for elements of the management system 6. Communicate with the audited party and audit team leader during the internal audit 7. Fill in internal audit records 8. Give non-conformance items in internal audit 9. Observe corrective measures for non-conformance 10. Observe health, occupational and environmental safety rules and regulations	1.1. Understand the internal audit scheme and plan 1.2. Prepare internal audit forms 1.3. Identify key points of internal audit 1.4. Implement internal audit plan 1.5. Supervise the rectification and verification of non-conformance **2.0 Principles** The person must be able to explain the principles of: 2.1. Sampling audit 2.2. Randomness and systematicness of sampling 2.3. Finding compliance 2.4. Quality Management Systems - Fundamentals and Vocabulary (ISO 9000) 2.5 Guidelines for Auditing Management System (ISO 19011) 2.6 Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1. Knowledge of quality management system in testing laboratories 3.2. Internal audit criteria 3.3. Internal audit skills **4.0 Essential Skills** 4.1. Comprehensive analysis and processing skills 4.2. Objective evaluation skills 4.3. Management skills

	4.4. Communication skills
Description on the End Product / Service	Internal audits are conducted in accordance with the laboratory management system and internal audit plan
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operation for laboratory safety 3. Specifications for safe and standardized operation of instruments 4. Quality management system 5. Testing laboratory management 6. Disposal of laboratory waste

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duty	ENDORSE TESTING METHODS	**Duty No.**	**708**
Task	CONFIRM NON-STANDARD TESTING METHODS	**Task No.**	**7081**
Performance Criteria	The person performing this task must be able to confirm non-standard testing methods in accordance with the testing method management procedures and testing method confirmation procedures		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Testing method confirmation procedures 2. Instrument operating manual 3. Testing reagents and consumables, instruments and equipment: pipette, filter membrane, sample bottle, electronic balance, chromatograph, spectrometer, solid-phase extraction device, etc. 4. Personal Protective Equipment (PPE): goggles, gloves, work clothes, etc. 5. Computer		

Evidence Requirements	
Actual performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Adhere to occupational health and safety precautions when performing the task 2. Identify the category of non-standard testing methods 3. Personnel allocation and collaboration for non-standard testing methods	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Confirm characteristic quantities of non-standard testing methods 1.2. Validate non-standard testing methods within and between laboratories 1.3. Evaluate the uncertainty

4. Confirm the characteristic quantity of non-standard testing method (including but not limited to): measurement uncertainty of test results, detection limit, precision, recovery rate, method selectivity, working curve linearity and correlation coefficient, repeatability limit and reproducibility limit, applicable concentration range and sample matrix, typical sample test, etc. 5. Confirm the validation of non-standard testing methods in the laboratory (certified standard material labeling recovery, comparison with results obtained from other testing methods, etc.) 6. Confirmation and validation of non-standard testing methods between laboratories (inter laboratory comparison, participation in ability verification, or measurement review) 7. Evaluation of uncertainty 8. Fill in the original testing records and relevant records and reports 9. Dispose of wastes 10. Clean tools, equipment and workplace	**2.0 Principles** The person must be able to explain the principles of: 2.1 Good Laboratory Practice (GLP) 2.2. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) 2.3 Laboratory biosafety standards **3.0 Theories** The person must be able to explain: 3.1. Knowledge of analytical chemistry 3.2. Microbiological test procedure 3.3. Operating procedures for instrument analysis **4.0 Essential Skills** 4.1 Data processing and rounding off skills 4.2. Statistical analysis skills 4.3. Report writing skills 4.4. Computer application skills

Description of the End Product / Service	the Non-standard testing methods are confirmed in accordance with the testing method management procedures and testing method confirmation procedures.
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operation for laboratory safety 3. Specifications for safe and standardized operation of equipment 4. Disposal of laboratory waste 5. Testing laboratory management

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Job Title	ENDORSE THE TESTING METHOD	**Duty No.**	**708**
Task Name	PREPARE METHOD CONFIRMATION REPORT	**Task No.**	**7082**
Performance Criteria	The person performing this task must be able to prepare method confirmation reports for newly confirmed methods in accordance with the testing method management procedures and testing method confirmation procedures		
Range Statement	This task may be carried out in the laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Testing method confirmation procedures 2. Computer 3. Statistics and analysis software 4. Safety and hygiene gear		

Evidence Requirements	
Actual performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Design the format of method confirmation report 2. Specify who will participate in method confirmation 3. Specify the process and conclusion of resource demand verification (instruments and reagents, standard solution, conditions, sample treatment, etc.) 4. Specify the process and conclusions for determining method performance (selection and	**Detailed Knowledge About:** **1.0Methods** The person performing this task must be able to explain how to: 1.1. Prepare method confirmation report 1.2. Prepare original testing records **2.0 Principles** The person must be able to explain the principles of: 2.1 Good Laboratory Practice (GLP) 2.2. Methodology validation principles 2.3. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025)

optimization of conditions, accuracy, precision, linearity, sensitivity, specificity, typical sample testing, graphs, tables, etc.) 5. Specify the test results of typical sample determination 6. Specify the laboratory comparison process and conclusions of non-standard methods 7. Specify the inter-laboratory comparison process and conclusions of non-standard methods 8. Prepare original record forms 9. Add original data record form or figure 10. Summarize and confirm conclusions (specify whether the requirements are met) 11. Specify the identification and dates of reviewers and approvers 12. Observe health, occupational and environmental safety rules and regulations	**3.0 Theories** The person must be able to explain: 3.1. Procedures for testing laboratory management **4.0 Essential Skills** 4.1 Data processing and rounding off skills 4.2. Statistical analysis skills 4.3. Report writing skills 4.4. Computer application skills **5.0. Math skills** 5.1. Mathematical statistics skills
Description on the End Product / Service	The method confirmation report of non-standard testing method is prepared in accordance with the testing method management procedures and testing method confirmation procedures
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational health and safety 2. Basic operating regulations for laboratory safety 3. Specifications for safe and standardized operation of instruments 4. Quality management system 4. Analytical chemistry

	6. Disposal of laboratory waste

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	CONDUCT LABORATORY SAFETY MANAGEMENT	**Duty No.**	**709**
Tasks	DEVELOP LABORATORY SAFETY MANAGEMENT SYSTEM	**Task No.**	**7091**
Performance Criteria	The person performing this task shall be able to develop the testing laboratory safety management system under the supervision of senior food inspection and testing engineer according to the Laboratory safety management standards.		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Standard operating procedures and manual for laboratory safety management 2. Personal Protective Equipment (PPE): goggles, gloves, work clothes, rubber shoes, etc. 3. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Establish an organizational structure and responsibilities for laboratory safety management 2. Develop a safety management system for the laboratory 3. Develop emergency preparedness and response mechanisms for the laboratory 4. Establish a laboratory hazard identification and risk assessment	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Establish an organization and responsibilities for laboratory safety management 1.2. Plan the structure and functions of the laboratory safety management system 1.3. Identify laboratory hazards 1.4. Develop protective measures and measures 1.5. Develop emergency preparedness and response mechanisms for the laboratory

mechanism, and establish corresponding safety management systems for electrical, mechanical, and chemical factors 5. Establish personnel safety awareness, ability, and qualification evaluation methods, with a comprehensive personnel training and management system 6. Observe health, occupational and environmental safety rules and regulations	1.6. Develop methods for selecting, training, and hiring laboratory safety management personnel **2.0 Principles** The person must be able to explain the principles of: 2.1 Good Laboratory Practice (GLP) 2.2. Accreditation Criteria for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025) **3.0 Theories** The person must be able to explain: 3.1. Elements for laboratory safety management 3.2. Structure and function of food analysis and testing laboratory 3.3. Laboratory hazards 3.4 Handling methods for common laboratory safety issues **4.0 Essential Skills** 4.1 Contingency ability 4.2 Communication skills 4.3 Ability to solve problems
Description on the End Product / Service	Thelaboratory safety management system is developed according to the general safety requirements for testing laboratories and specific standards for food testing laboratories.
Detailed knowledge:	**Detailed Knowledge About:** 1. Occupational safety and health 2. Laboratory safety operation 3. Instrument and equipment safety operation 4. Establishment, operation, supervision and improvement of laboratory safety management system

	5. Potential hazards in the laboratory and emergency response methods 6. Disposal method of laboratory wastes

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duty	CONDUCT LABORATORY SAFETY MANAGEMENT	**Duty No.**	**709**
Task	CONDUCT LABORATORY SAFETY MANAGEMENT TRAINING	**Task No.**	**7092**
Performance Criteria	The person performing this task shall be able to organize laboratory safety management training under the supervision of senior food inspection and testing engineers in accordance with laboratory management standards and safety management manuals		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Standard operating procedures and manual for laboratory safety management 2. Training manual 3. Evaluation and assessment methods 4. Computer 5. Safety gear		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Determine the persons who need to be trained 2. Determine the training tasks and expected goals 3. Determine the place for training 4. Determine training content 5. Organize training 6. Evaluate the training effectiveness	**Detailed Knowledge About:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Develop a laboratory safety training plan 1.2. Implement laboratory safety training plan 1.3. Evaluate the effectiveness of laboratory safety training **2.0 Principles** The person must be able to explain the principles of:

7. Clean workplaces 8. Observe health, occupational and environmental safety rules and regulations	2.1. Implementation measures for laboratory safety management 2.2. Procedures for laboratory safety management training **3.0 Theories** The person must be able to explain the principles of: 3.1. Knowledge of testing laboratory management 3.2. Content of laboratory safety management rules and regulations **4.0 Essential Skills** 4.1 Contingency ability 4.2 Communication skills 4.3 Ability to solve problems
Description on the End Product / Service	The laboratory safety management training is conducted according to the Laboratory safety management standards.
Detailed knowledge:	**Detailed Knowledge About:** 1. Establishment, operation, supervision and improvement of laboratory safety management system 2. Potential hazards in the laboratory and emergency response methods 3. Occupational safety and health

Occupation	FOOD INSPECTION AND TESTING ENGINEER	**Occupation Code**	
Duties	CONDUCT ABORATORY SAFETY MANAGEMENT	**Duty No.**	**709**
Tasks	ORGANIZE LABORATORY FIRE SAFETY EMERGENCY DRILLS	**Task No.**	**7093**
Performance Criteria	The person performing this task must be able to complete the identification of laboratory hazards and harmful factors according to the laboratory fire safety emergency plan, propose safety technology and safety management strategies, and conduct fire safety drills for the laboratory personnel under the supervision of a senior food inspection and testing engineer		
Range Statement	This task may be carried out in a food testing laboratory under the supervision of a senior food inspection and testing engineer. The following equipment and tools will be required in performing the task: 1. Standard operating procedures and manual 2. Personal Protective Equipment (PPE): goggles, gloves, work clothes, rubber shoes, respiratory mask, fire shield, etc. 3. Computer		

Evidence Requirements	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Organize learning of laboratory fire safety emergency plans 2. Conduct mobilization and personnel allocation, including the commander in chief, deputy commander in chief, on-site preparation personnel, and specify the roles and	Detailed Knowledge About: **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Identify potential hazards and harmful factors in the laboratory 1.2. Take protective measures 1.3. Use emergency response methods 1.4. Dispose of wastes at accident sites **2.0 Principles**

responsibilities of personnel participating in the drill 3. Prepare equipment and materials for emergency drills, including but not limited to dry powder fire extinguishers, 1 dedicated stretcher, protective clothing, masks, first aid kits, escape tools, and warning tapes 4. Organize special practical exercises for all personnel: special learning and training on the use of alarms, power cut off, fire extinguishers, gas masks, alarm receiving, self-rescue and escape, etc. 5. Determine the drill time 6. Organize all personnel to simulate and deal with gas poisoning and high temperature burn accidents, acid and alkali burn accidents, initial fire accidents in the laboratory, and organize emergency evacuation 7. Confirm that the on-site personnel are completely out of danger and the danger is under control, and announce the end of the emergency drill.	The person must be able to explain the principles of: 2.1. Characteristics of hazards and harmful factors 2.2 Hazard factors and hazard degree 2.3 Protection measures for hazard factors 2.4 Selection order of risk control **3.0 Theories** The person must be able to explain: 3.1. Laboratory safety management rules and regulations 3.2. Identification of laboratory hazards 3.3. Common accident handling methods of laboratory 3.4. Disposal method of wastes **4.0 Essential Skills** 4.1 Contingency ability 4.2 Communication skills 4.3 Ability to solve problems 4.4. Emergency accident handling skills

8. Summarize the causes of accidents, lessons learned, problems during the drills, and corrective measures. 9. Clean up the drill site, de-alert, restore power and water supply, pick up fire equipment, rescue supplies, and other emergency supplies on site, and return personnel to their work positions 10. Write an evaluation report on laboratory fire safety emergency drills 11. Organize and save the images, photos, and attendance forms of the drill site 5. Propose safety technology response measures based on risk assessment 6. Evaluate existing risk control measures 7. Handle emergency at accident sites 8. Carry out rescue activities according to the accident emergency plan 9. Provide safety training for experiment personnel 10. Demonstrate accident handling methods 11. Dispose of wastes .	

Description on the End Product / Service	The laboratory fire safety drills are organized according to safety standards of food testing laboratories
Detailed knowledge:	**Detailed Knowledge About:** 1. Establishment, operation, supervision and improvement of laboratory safety management system 2. Potential hazards in the laboratory and emergency response methods 3. Occupational safety and health

APPENDIX 1: DACUM CHARTS FOR FOOD INSPECTION AND TESTING ENGINEER – NTA LEVEL 7

Duties	**Tasks**	**Enablers**
1.0 Establish sampling operation compliance	1.1 Manage sampling operations 1.2 Develop food safety sampling plan and scheme 1.3 Manage sampling risk assessment	**Generic Skills and Knowledge** • Standardized sampling skills • Food testing skills • Risk identification and troubleshooting skills • Data processing and analysis skills • Skill of developing plans and schemes • Summarizing skills • Report writing skills • Communication and contingency skills • Customer service skills • Management skills • Computer application skills • Knowledge of different sampling methods • Knowledge of sampling transportation management • Knowledge of testing laboratory management • Knowledge of occupational health and safety **Tools and Equipment** • Sampling plan • Sampling scheme

Duties	Tasks	Enablers
		• General rules for food sampling inspection • Measures for food safety sampling management • Annual plan for superior food safety sampling inspection • Results of preliminary food safety testing • Quality control plan for products requiring special attention • Food safety risk monitoring plans at all levels • Sampling results of food safety testing • Camera • Computer **Materials** • Paper, highlighter, marker, signing pen, recording pen **Requirements for Employees** • Teamwork • Communication skills • Integrity and confidentiality • Time management and Accountability • Adhere to professional ethics
2.0 Establish sample	2.1 Develop sample management procedures	**Generic Skills and Knowledge**

Duties	Tasks	Enablers
management compliance	2.2 Develop sample preparation operation instructions 2.3 Develop sample management operation instructions	• Sample management skills • Sample preparation skills • Summarizing skills • Ability to analyze and solve problems • Skill of developing plans and schemes • Communication and contingency skills • Computer application skills • Laboratory sample management methods • Food sample preparation, circulation, and preservation methods • Knowledge of testing laboratory management • Food safety laws and regulations **Tools and Equipment** • Assignment for testing tasks • Product execution standard • Standard for testing methods • Sample management procedures • Management procedure for inspection items and articles • Control procedure for facility and environmental condition • Computer

Duties	Tasks	Enablers
		Materials • Paper and pen **Requirements for Employees** • Teamwork • Trustworthy • Integrity and confidentiality • Time management and Accountability • Adhere to professional ethics
3.0 Conduct large instrument and equipment management	3.1 Supervise the procurement and acceptance of large instruments and equipment 3.2 Carry out traceability and intermediate check of large instruments and equipment 3.3 Carry out the maintenance of large instruments and equipment 3.4 Manage the proper operations of large instruments and equipment	**Generic Skills and Knowledge** • Communication and cooperation • Computer application skills • Operation skills of large instruments • Writing skills • Data statistics and processing capabilities • Ability to analyze data results • Knowledge of testing laboratory instrument management • Knowledge of food inspection and testing • Knowledge of instrument analysis • Knowledge of using and maintaining large instruments • Basic operating knowledge for

Duties	Tasks	Enablers
		laboratory safety • Knowledge for safe and standardized operation of equipment • Knowledge of occupational health and safety • Knowledge of disposal of laboratory wastes **Tools and Equipment** • Local authority's standard on food • Operating procedures for instrument and equipment • Instrument operating manual • Equipment procurement and acceptance procedure • Metrological traceability procedure and intermediate check procedure • Instrument and equipment usage management procedure • Chromatographic, spectral and mass spectrometric instruments, filtration devices, solid phase extraction devices, rotary evaporator, termovap sample concentrator, and other relevant instruments and equipment • Personal protective equipment such as goggles, protective

Duties	Tasks	Enablers
		clothing, gloves, etc. • Computer **Materials** • Reagents, filter membranes, sample bottles, pipettes, Volumetric flask and other related experimental reagents and consumables • Experimental reference materials **Requirements for Employees** • Teamwork • Objectivity and impartiality • Dedication • Honesty and trustworthiness • Time management and Accountability • Adhere to professional ethics
4.0 Perform Mass spectrometry detection	4.1 Carry out mass spectrometry analysis 4.2 Conduct the improvement and optimization of mass spectrometry monitoring methods	**Generic Skills and Knowledge** • Using communication skills to communicate with service recipients • Computer application skills • Operation skills of large

Duties	Tasks	Enablers
	4.3 Manage abnormal mass spectrometer data through re-testing	instruments ● Writing skills ● Data statistics and processing capabilities ● Ability to analyze data results ● Ability to find and solve problems ● Knowledge of testing laboratory instrument management ● Knowledge of food inspection and testing ● Knowledge of instrument analysis principle ● Knowledge of using and maintaining large instruments ● Basic operating knowledge for laboratory safety ● Knowledge of safe and standardized operation of equipment ● Knowledge of occupational health and safety ● Knowledge of disposal of laboratory wastes **Tools and Equipment** ● Local authority's standard on food ● Standard testing operating procedures

Duties	Tasks	Enablers
		• Instrument operating manual • Testing method validation procedures • Test result management procedures • Mass spectrometric instruments, filtration devices, solid phase extraction devices, rotary evaporator, termovap sample concentrator, and other relevant instruments and equipment • Personal protective equipment such as goggles, protective clothing, gloves, etc. • Computer **Materials** • Reagents, filter membranes, injection bottles, pipettes, Volumetric flask and other related reagents and consumables • Experimental reference materials **Requirements for Employees** • Teamwork • Objectivity and impartiality • Dedication • Honesty and trustworthiness

Duties	Tasks	Enablers
		● Time management and Accountability ● Adhere to professional ethics
5.0 Perform pathogenic	5.1 Carry out the detection of common pathogenic bacteria	**Generic Skills and Knowledge** ● Microbial testing skills

Duties	Tasks	Enablers
bacteria detection	5.2 Control the quality of culture medium	• Experiment design skills • Data processing and analysis skills • Summarizing skills • Objective evaluation skills • Report writing skills • Management skills • Communication skills • Customer service skills • Knowledge related to food microbiology • Knowledge of food inspection and testing • Knowledge of testing laboratory management • Knowledge of quality management system • Basic operating knowledge for laboratory safety • Biological safety operation knowledge • Knowledge of safe and standardized operation of equipment • Knowledge of occupational health and safety • Knowledge of disposal of laboratory wastes • Operating procedures for pathogenic bacteria detection

Duties	Tasks	Enablers
		Tools and Equipment ● Local authority's standard on food ● Operation instruction for training medium acceptance and quality control ● Document for laboratory management system ● Laboratory quality records and technical records ● Refrigerator, ultra clean workbench, biosafety cabinet, incubator, autoclave, thermostatic incubator, microscope, homogenizer, oscillator, computer, other relevant instruments and equipment ● Personal protective equipment such as goggles, sterile White coat, hats, gloves, masks, shoe covers, etc. ● Computer **Materials** ● Alcohol burner, scissors, tweezers, sterilized alcohol, petri dish, straw, pipette, inoculating loop, conical flask, and other materials required

Duties	Tasks	Enablers
		for the experiment ● Corresponding standard strains ● Original record ● Paper and pen **Requirements for Employees** ● Teamwork ● Good at communication ● Honesty and trustworthiness ● Rigorous, meticulous and adhering to standards ● Dedication ● Hardworking ● Time management and Accountability
6.0 Establish the compliance in testing records and reports	6.1 Review the existing testing records and reports 6.2 Validate the analysis and conformity of the data analysis	**Generic Skills and Knowledge** ● Sampling skills ● Food testing skills ● Testing process quality control and evaluation skills ● Data processing and analysis skills ● Highly sensitive to data ● Summarizing skills ● Management skills ● Teamwork ● Communication and contingency skills ● Computer application skills ● Knowledge of testing laboratory management

Duties	Tasks	Enablers
		• Knowledge of uncertainty of inspection results • Knowledge of contract review • International System of Units and its application • Rounding off theory of significant figures • Compilation procedures for original records and testing reports • Knowledge of laboratory safety and occupational health **Tools and Equipment** • Original testing record • Product execution standard • Standard for testing methods • Task assignment • Standard for report/certificate preparation • Uncertainty report • Sampling form/commission form **Materials** • Paper and pen **Requirements for Employees** • Teamwork • Communication skills • Objectivity and impartiality

Duties	Tasks	Enablers
		• Dedication • Rigorous, meticulous and adhering to standards • Time management and Accountability
7.0 Test the quality control process using external agents	7.1 Evaluate the uncertainty of the testing method 7.2 Participate in external quality control activities 7.3 Conduct internal audits	**Generic Skills and Knowledge** • Testing skills • Experiment design skills • Sampling audit skills • Data processing skills • Summarizing skills • Objective evaluation skills • Report writing skills • Management skills • Communication skills • Customer service skills • Knowledge of analytical chemistry • Knowledge of food inspection and testing • Knowledge of testing laboratory management • Knowledge of quality management system • 3Methods to ensure the

Duties	Tasks	Enablers
		effectiveness of results ● Internal audit guidelines and techniques ● Knowledge of occupational health and safety ● Basic operating knowledge for laboratory safety ● Knowledge of safe and standardized operation of equipment ● Knowledge of disposal of laboratory wastes **Tools and Equipment** ● External quality control plan ● Testing method operation instructions ● Operation instructions for external quality control items ● Document for laboratory management system ● Laboratory internal audit scheme and plan ● Checklist for evaluating management system elements ● Internal audit process record form: Non-conformance record form, corrective action record form, etc. ● Laboratory quality records and technical records

Duties	Tasks	Enablers
		• Electronic balance, chromatograph, spectrometer, solid-phase extraction device and other related instruments and equipment • Personal protective equipment such as goggles, protective clothing, gloves, etc. • Computer **Materials** • Reagent, pipette, volumetric flask, beaker, filter paper, membrane, sample bottle and other related reagent consumables • Experimental related standard products **Requirements for Employees** • Teamwork • Good at communication • Honesty and trustworthiness • Rigorous and meticulous • Adhere to regulations • Dedication • Time management and Accountability
8.0 Endorse the testing method	8.1 Confirm the non-standard methods	**Generic Skills and Knowledge** • Testing skills

Duties	Tasks	Enablers
	8.2 Prepare method confirmation report	• Experiment design skills • Data processing and analysis skills • Summarizing skills • Objective evaluation skills • Report writing skills • Management skills • Communication skills • Customer service skills • Knowledge of analytical chemistry • Related knowledge of methodology validation • Knowledge of testing laboratory management • Knowledge of quality management system • Basic operating knowledge for laboratory safety • Knowledge for safe and standardized operation of equipment • Knowledge of safe and standardized operation of equipment • Knowledge of occupational health and safety • Knowledge of disposal of laboratory wastes • Method confirmation procedures

Duties	Tasks	Enablers
		Tools and Equipment ● Local authority's standard on food ● Pipette, filter membrane, sample bottle, electronic balance, chromatograph, spectrometer, solid-phase extraction device, and other testing equipment ● Personal protective equipment such as goggles, protective clothing, gloves, etc ● Data analysis software ● Computer **Materials** ● Reagents, pipette, filter membranes, sample bottles, filter paper, volumetric flask and other related reagents and consumables ● Paper and pen **Requirements for Employees** ● Teamwork ● Communication skills ● Trustworthy ● Dedication

Duties	Tasks	Enablers
		• Rigorous, meticulous and adhering to standards • Time management and Accountability
9.0 Conduct laboratory safety management	9.1 Develop laboratory safety management system 9.2 Conduct laboratory safety management training 9.3 Organize laboratory fire safety drills	**Generic Skills and Knowledge** • Communication skills • Management skills • Text editing and processing skills • Computer application skills • Firefighting equipment operation skills • Knowledge of laboratory safety and health • Knowledge of laboratory organization and structure • Safety requirements for laboratory water, electricity, gas, and fire • Method for formulating laboratory safety management documents • Emergency handling skills for laboratory accidents • Knowledge and skills for disposal of laboratory wastes **Tools and Equipment** • Local authority's standard on food

Duties	Tasks	Enablers
		• Laboratory safety management documents • Laboratory safety management record form • Laboratory safety training plan • Laboratory safety training assessment form • Laboratory safety drill plan • Personal protective equipment such as goggles, fire shields, gloves, masks, gas mask, rubber shoes, etc • Computer **Materials** • Warning posts, fire extinguishers, fire extinguishing sand, absorbent cotton and other safety firefighting equipment • Pen, paper **Requirements for Employees** • Teamwork • Good at communication • Trustworthy • Dedication • Time management and Accountability • Rigorous, meticulous and

Duties	Tasks	Enablers
		adhering to standards