



CONFECTIONARY PROCESSING

Level II

Based on May 2019, Version 2 Occupational standards

Module Title: - Conducting operational check & rectification

LG Code: IND COP2 M7 0920LO (1-2)

LG (31-33)

TTLM Code: IND COP2 TTLM 1020 v1

October **2020**



LO 1 #Prepare operational test equipment before use.....	3
Instruction sheet.....	3
Information sheet 1	5
Setting up operational test equipment in accordance with	5
Test method.....	5
Information sheet 2	15
Performing safety check and pre –use	15
2.1 Performing safety check and pre –use.....	15
Information sheet 3	19
Identifying and reporting faulty or unsafe equipment	19
Information sheet 4	21
Checking calibration status of equipment	21
4.1 Checking calibration status of equipment	21
LO 2 # Check products before transferred to the next operation.....	25
Instruction sheet.....	25
Information sheet 1	27
Carrying out all appropriate operational test in each.....	27
Unit operation.....	27
Information sheet 2	31
Recording data in accordance with enterprise	31
Procedure.....	31
Information sheet 3	35
Identifying and reporting out of specification or typical result to appropriate personnel	35
LAP TEST.....	41
Performance Test.....	41
Reference	43
Acknowledgement	44



LG #32	LO 1 #Prepare operational test equipment before use
---------------	--

Instruction sheet
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none">• Setting up operational test equipment in accordance with test method.• Performing safety check and pre –use• Identifying and reporting faulty or unsafe equipment.• Checking calibration status of equipment <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none">• Set up operational test equipment in accordance with test method.• Perform safety check and pre –use<ul style="list-style-type: none">• Identify and reporting faulty or unsafe equipment.• Check calibration status of equipment
Learning Instructions:

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP”.



Information sheet 1	Setting up operational test equipment in accordance with Test method
----------------------------	---

1.1 Setting up operational test equipment in accordance with test method

Laboratory testing is an important process, which relies on scientific analysis to identify problems with food products. It provides analytical data on the quality of a product or production process to support quality control in the HACCP (Hazard analysis critical control point) system. The objective of quality control is to identify contaminants in raw material, or contamination after a product is produced and before it is placed on the market. Additionally, laboratory testing is important for the research and development of new products, another benefit of laboratory testing is compliance with regulations for both the import and export of food products to different countries. Food regulation is designed to protect public health and the safety of consumers.

Due to the chemical composition rich in nutrients and high humidity, the confectionery products are favorable environments for the development of micro-organisms. Therefore, respecting the steps of technological process, specific to each group of cakes and respecting the working parameters (time, temperature, and relative air humidity) will ensure the attainment of healthy products which do not endanger to consumers' health.

❖ Common confectionary process measuring equipment's are

- hygrometer
- pressure gauge
- beam balance
- analogue and digital meters and charts/record
- Temperature measuring devices, such as thermometers and thermocouples



1.1.1 The following is a brief description of the different types of instrument

- **Specific Gravity, Density** the determination of density or specific gravity of syrups was a traditional method of check by the craft confectioner, and the scaled hydrometer is too well known to warrant description. Continuous methods of density checking and adjustment have been developed that rely on the change of weight of a column of the liquid in a flexible U-tube. For checking the density of whipped confectionery products, a simple cylindrical container with a wide mesh wire bottom has proved useful. The whip is filled into the container until it exudes from the wire mesh, when it is scraped off flat at both ends with a knife, and the whole weighed.

The tare of the container being known, the density is quickly determined. This container avoids the formation of voids that are liable to form in a cylinder with a solid Bottom.

There are many physical methods for the determination of density. Temperature measurement is still the means of controlling the concentration of sugar syrups for hard boiling and other syrups that do not contain interfering ingredients such as gelatin, pectin, or solid substances. .Accurate temperature measurement and control are very important in chocolate tempering and cooling. The following types of measurements are in use:

- **Thermometers**

All thermometers received at the factory must be checked. For this purpose, a thermostatically controlled oil bath with stirring device may be used and it should be large enough for a number of thermometers to be tested at one time.

The thermostat is reset periodically at different temperatures so that the thermometers can be checked at specific temperatures throughout the range. The checking of "in plant" thermometers is also very important and regular inspection must be made by plant superintendents. When errors are found, the thermometer should be immediately replaced it is very bad practice for the plant Operator to have to make corrections to an observed temperature or to attach a



label to the thermometer showing the correction to be applied. "Certified" thermometers, previously mentioned, should be used for Checking

- **Electronic Moisture Meters**

Electronic testers are used in many industries for the determination of moisture in powders or granulated products, such as flour and grain. In the confectionery industry, the one main application is to check the moisture content of molding starch, either in the depositing plant or from the driers. Most instruments used are based on electrical capacitance, and the material to be tested is contained in a cell of standard dimensions.

- **Hygrometers**

It is often necessary to obtain records of relative humidity conditions in factory departments such as stockrooms, starch rooms, or crystallizing departments. The simplest reliable instrument is the whirling or sling hygrometer used in conjunction with the correct psychometric tables.

.



1.1.2 Process parameter on psychrometric chart

- **Humidity**

Refers to the amount of moisture or water vapor present in the air. Hygroscopic substances absorb moisture from the air; therefore any change in humidity will impact the consistency of that substance. Most confectionery items—chocolates, caramels, hard candies, chewing gums, toffees and others—are rich in sugar, making them hygroscopic at certain moisture levels. So when exposed to excessively humid conditions, confections will absorb more moisture, making them sticky, runny or moldy. Humidity affects all processing.

A hygrometer is an instrument used to measure the amount of humidity and water vapor in the atmosphere, soil or a confined space. Instruments used to measure humidity typically rely on the measurement of some other quantity such as temperature, pressure, mass or a mechanical or electrical change in a substance as moisture is absorbed. By comparison and calculation, these quantities can determine a measurement of humidity:

- **Relative humidity**

RH is the ratio of water vapor present in a given volume of air at a given temperature to the maximum amount of water vapor the air can hold, expressed as a percent. Wet-bulb temperature is the lowest temperature to which air can be cooled by the evaporation of water into the air at a constant pressure. It can be measured by using a thermometer with the bulb wrapped in a water-soaked cloth. The wet bulb thermometer indicates a temperature close to the true (thermodynamic) wet bulb temperature. At 100 percent RH, the wet-bulb temperature is equal to the air temperature, and therefore would be lower at lower humidity

- **High Humidity Effects** Two of the basic ingredients used to make candy are sucrose and corn syrup, so the majority of candy is highly hygroscopic in nature.

This can lead to candy that does not cool correctly (sticky, tacky, cloudy), is prone to mold formation and is softer than desired. In addition, high humidity can cause grainy and irregular coating, sugar blooms and flavor changes Bloom is defined as the phenomenon in which fat and sugar crystals rise to the surrounding.

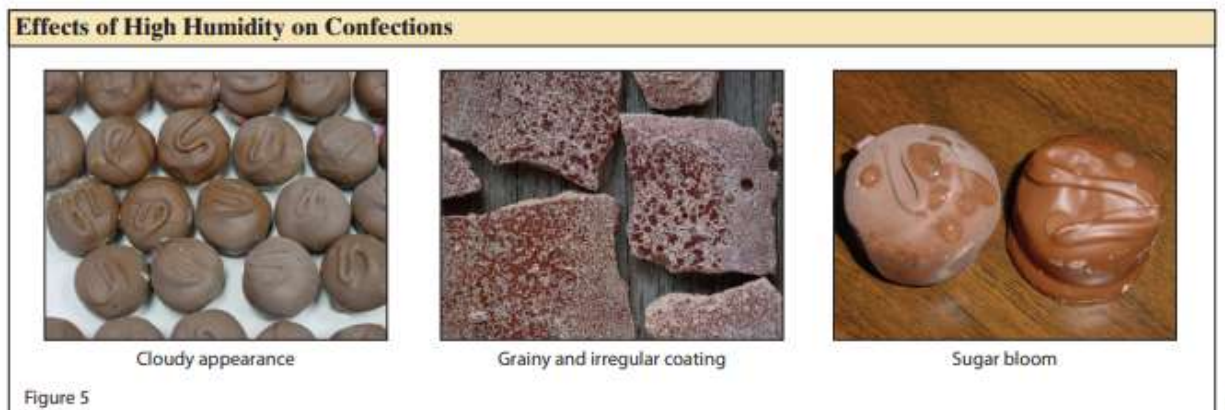


Fig 1.1 shows effect of high humidity.

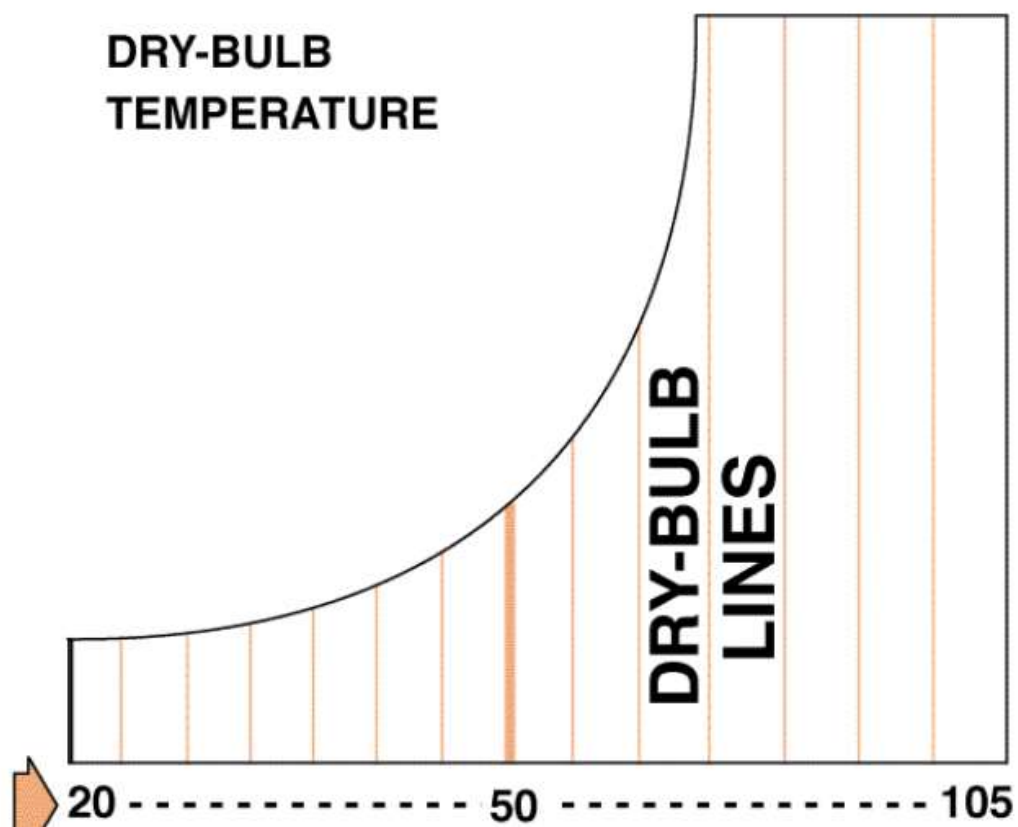


Fig1. 2 shows dry bulb temperature line on the psychrometric chart

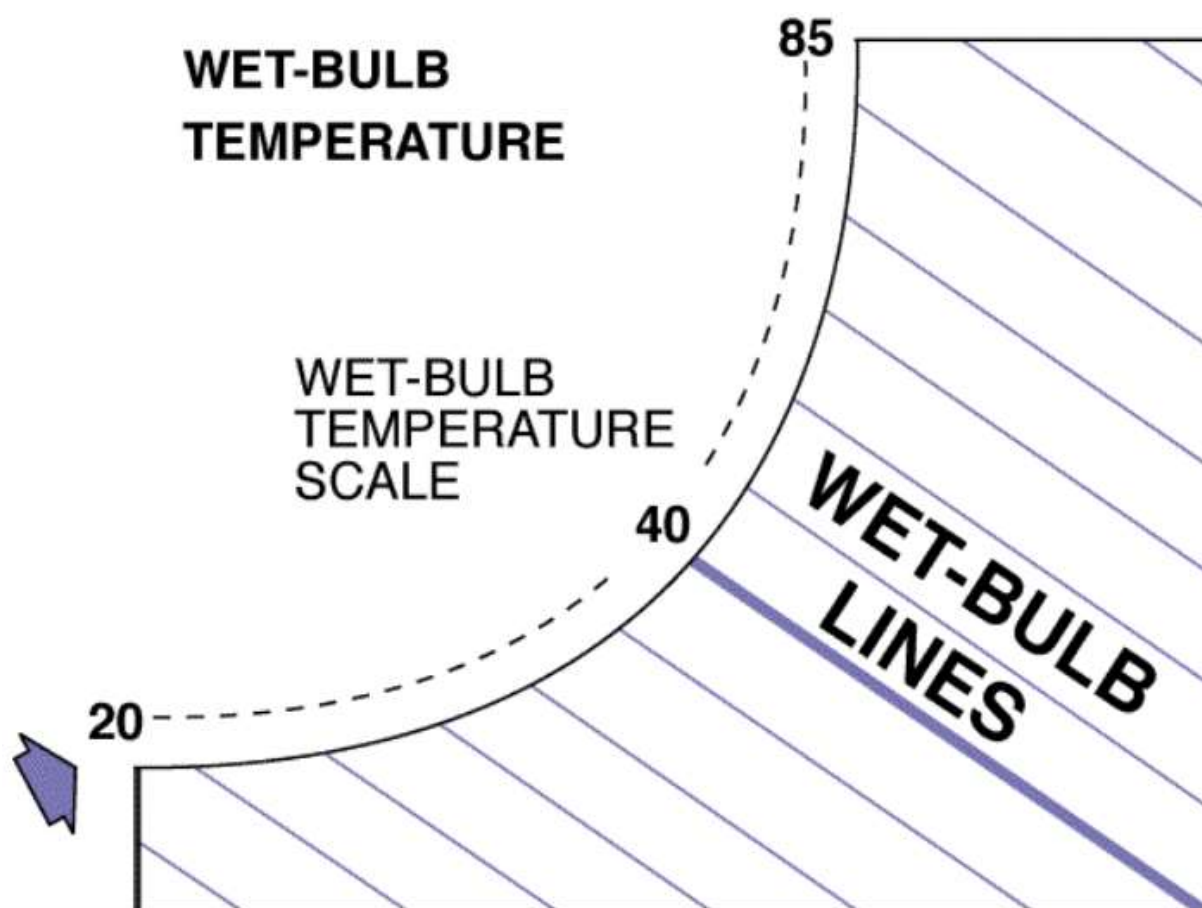


Fig1. 3 shows wet bulb temperature on the psychometric chart line

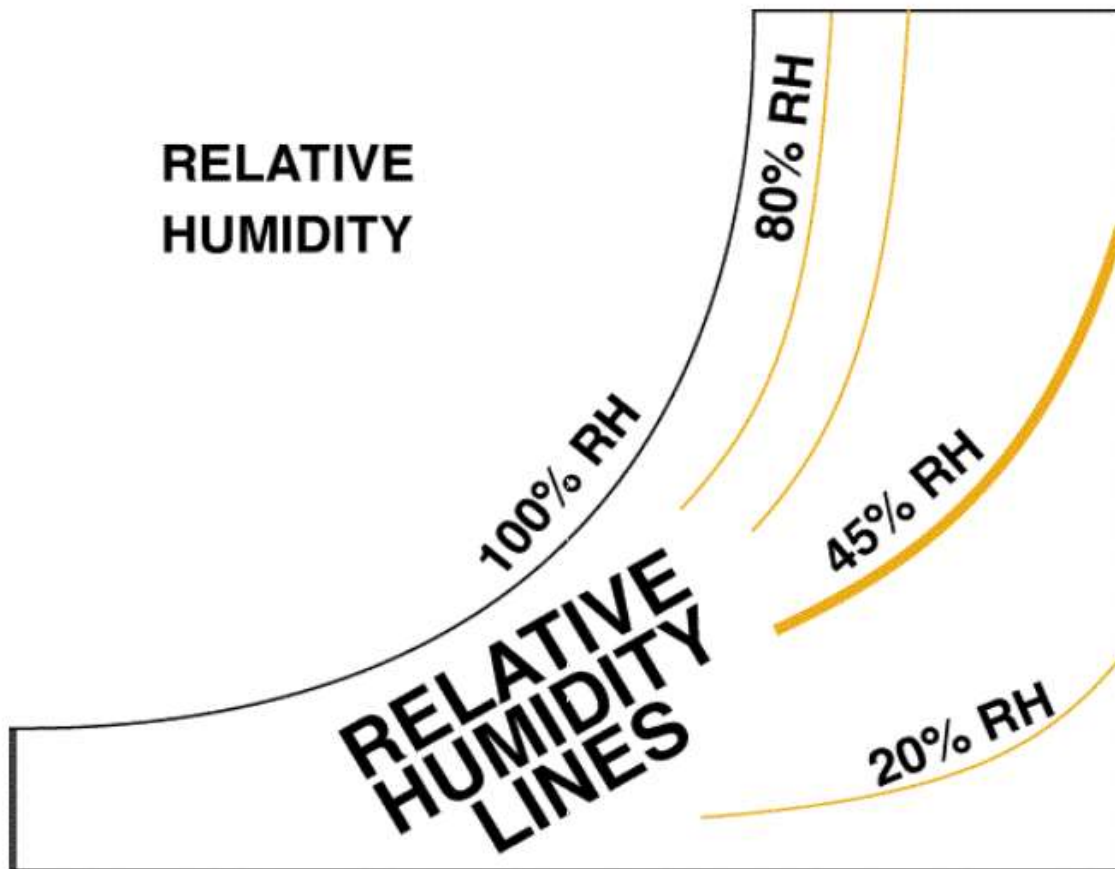


Fig1. 4 shows relative humidity on the psychometric chart line

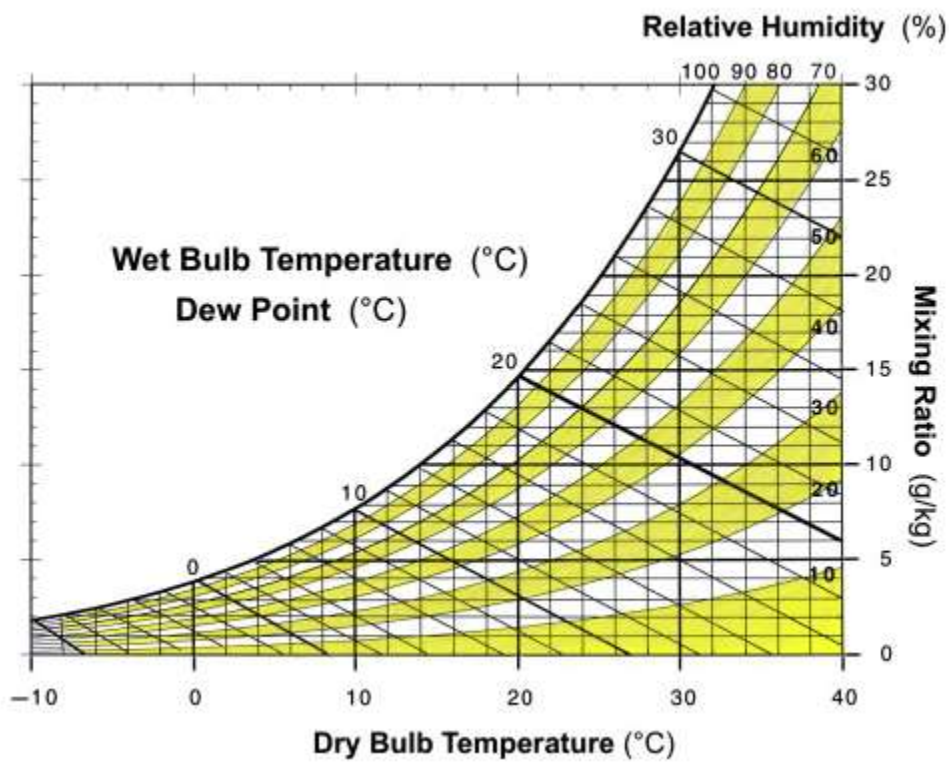


Fig1. 5 show the relation between RH, WBT, and DBT.

**Self-check 1****Written test****I Say True or False the following questions (1.5 each)**

1. Laboratory testing is an important process, which relies on scientific analysis to identify problems with food products.
2. Relative humidity or RH is the ratio of water vapor present in a given volume of air at a given temperature to the maximum amount of water vapor the air can hold, expressed as a percent.
3. Humidity refers to the amount of moisture or water vapor present in the air.

II choose the best answer from the given alternatives (1.5 each)

- 1 .Equipment used to obtain record of relative humidity condition is:
A. thermometer B .hydrometer C .metro scope D. all
- 2 ----- is an instrument used to measure the amount of humidity and water vapor in the atmosphere, soil or a confined space
A. Thermometer Hygrometer C. moisture analyzer D .all

III Explain the following question briefly

- 1 What is the use of hygrometer in confectionary processing? (2.5 point)

Name ----- ID, NO-----

Satisfactory rating ≥ 5 point unsatisfactory rating ≤ 5 point



Information sheet 2	Performing safety check and pre –use
---------------------	--------------------------------------

2.1 Performing safety check and pre –use

Food safety and hygiene is very important area in any food industries. Food factories has to keep basic good housekeeping and hygiene standards as any lack in this area would result in very poor performance of the business . This is also important as the consumers are very sensitive to foreign body complaints or anything which might affects individual health. Some governments have imposed very strict quality parameter for ingredients and their storage practices. Food safety and hygiene is very important area in any food industries. Food factories has to keep basic good housekeeping and hygiene standards as any lack in this area would result in very poor performance of the business . This is also important as the consumers are very sensitive to foreign body complaints or anything which might affects individual health.

Food manufacturers have to decide which QA system is most suitable to their specific situation and how this system should be implemented. In the food industry, a number of Quality Assurance (QA) systems are available like GMP (Good Manufacturing Practice), HACCP (Hazard Analysis Critical Control Points), ISO (International Organization for Standardization) and the international technical standard of BRC (British Retail Consortium). These systems and their combinations are applied for assuring food safety.

2.1.1 Carrying out a pre- checks

- **Preliminary operations:** check if the machine has been damaged during transport. Check the condition of the machine taking a close look at the outside and the inside. Any deformation of the visible parts indicates that the machine has been hit by something during transport. This could lead to malfunctioning. Check the tightening of screws, bolts and fittings.

Damage caused by transport should be attributed to the carrier and the manufacturer or its agent should be informed immediately of the situation

Page 15 of 44	Federal TVET Agency Author/Copyright	Confectionary Processing Level-II	Version -1 October 2020
---------------	--	--------------------------------------	----------------------------



2.1.2 Checking the safety devices:

Before starting the machine, the safety devices should be checked according to the following procedure:

- Correct operation of the emergency stop button, while the machine is working, press the emergency button: the machine should stop immediately.
- Correct operation of the safety limit switches, while the machine is working lift the protection grid, the machine should stop immediately.

2.1.3 Hazard Analysis and Critical Control Point (HACCP) is a preventive system designed to ensure that all food safety production is operated according to the Codex Alimentarius International Food Standards. The objective of the HACCP system is to prove that products are properly manufactured for the health and safety of consumers by avoiding three hazard sources:

- **Biological hazards:** Derived from microbial hazards such as salmonella and E coli bacteria..



Fig1. 6 biological hazards.

- **Chemical hazards:** Contamination with chemicals used in agriculture and the production processes of raw materials such as antibiotics, plant growth substances and pesticides, as well as food additives such as preservatives, and including chemicals that are used in the production/processing plant such as oil, grease and cleaning agents for equipment and machinery.
- **Physical hazards:** Foreign objects in food that can cause illness or injury to the consumer such as glass, pieces of metal, plastic or wood.

The application of a HACCP system is based on technical and scientific principles used to evaluate hazards and collect data for analysis. With this information, a plan can be devised to avoid problems and to monitor and solve problems that do occur, while continuously verifying the performance of the system.



Fig1. 7 physical hazards



Fig 1. 8 safely handled confectionary product

Fig 1.9 Food safety must be managed across the supply chain

**Self-check 2****Written Test****I Say true or false the following questions (1.5 each)**

- 1 Physical hazard are foreign objects in food that can cause illness or injury to the consumer such as glass, pieces of metal, plastic or wood.
- 2 Biological hazards are Contamination with chemicals used in agriculture and the production processes.
- 3 Hazard Analysis and Critical Control Point (HACCP) is a preventive system designed to ensure that all food safety production is operated according to the Codex Alimentarius International Food Standards
- 4 Food safety and hygiene is very important area in any food industries.

II choose the best answer from the given alternatives (2 point)

1 Foreign objects in food that can cause illness or injury to the consumer such as glass, pieces of metal, plastic or wood is:

A. Chemical hazard B. physical hazard C. Biological hazard D .all

III Explain the following question briefly (2 point)

2. Explain the cause and controlling mechanism of hazard?

Name ----- ID, NO-----

Satisfactory rating ≥ 5 point unsatisfactory rating ≤ 5 point



Information sheet 3	Identifying and reporting faulty or unsafe equipment
----------------------------	---

3.1 Identifying and reporting faulty or unsafe equipment

Faults is a program that allows a user to interact with a relational database through a forms-based interface to record preventive maintenance and field repairs of manufacturing equipment. All information necessary to identify the type and cause of equipment failure, time of occurrence, time of repair, etc. is stored in the relational database. Unlike existing paperless systems, this information is organized in a structured representation so that other application programs can perform facility-wide analysis.

Reports each report represents a single equipment maintenance event. A report object stores all the data unique to this event, such as the date of occurrence and current status. The report also makes reference to the lab users and resources.

The following attributes are stored on each report:

- The date this event was entered into the system.
- The date this event was cleared from the Status Board.
- A reference to the lab user who entered this event
- A reference to the resource this event occurred on.
- A reference to the comment storing text for this event
- : A unique number to identify this report.

**Self-check 3****Written Test****I Say true or false the following questions (2 point each)**

1. All information necessary to identify the type and cause of equipment failure, time of occurrence, time of repair, etc. is stored in the relational database.
2. A report object stores all the data unique to this event, such as the date of occurrence and current status.
3. Reports each report represents a single equipment maintenance event.
- 4 The date attribute is is not needed in the report system.

II choose the best answer from the given alternative. (2point)

1 ----- Is a program that allows a user to interact with a relational database through a forms-based interface to record preventive maintenance and field repairs of manufacturing equipment?

A. report B. data base C. Fault D. all

Name ----- ID, NO-----

Satisfactory rating ≥ 5 point unsatisfactory rating ≤ 5 point



Information sheet 4	Checking calibration status of equipment
----------------------------	---

4.1 Checking calibration status of equipment

Calibration is vitally important wherever measurements are important, it enables users and businesses to have confidence in the results that they monitor record and subsequently control.

Calibration is the process of comparing a reading on one piece of equipment or system, with another piece of equipment that has been calibrated and referenced to a known set of parameters. The equipment used as a reference should itself be directly traceable to equipment that is calibrated according to ISO/IEC 17025 ISO/IEC 17025 is the International Standard for the accreditation of Testing and Calibration Laboratories. It includes quality management system requirements along with technical requirements. In the UK, ISO/IEC 17025 accreditation is provided by UKAS. So, often calibration performed by an ISO/IEC 17025 accredited laboratory is referred to as 'UKAS Calibration'

4.1.1 How temperature calibration is carried out

In general use, calibration is often regarded as including the process of adjusting the output or indication on a measurement instrument to agree with value of the applied standard, within a specified accuracy however this is actually two processes: calibration and adjustment. It is important therefore to understand exactly what service you require. It is also important to understand what is being calibrated and how the calibration is being performed.

As an example, consider a digital thermometer that uses an external temperature probe; some calibration service providers will perform the calibration using a simulated temperature value that is applied to the thermometer only (i.e. without the temperature probe). Here, a test instrument is attached to the digital thermometer and a voltage



equivalent to a specific temperature is applied to the digital thermometer. The result is recorded, and the thermometer is then considered to be calibrated.

4.1.2Calibrating procedure for thermometer

- Fill two beakers with distilled water about two-thirds of the way full.
- In one beaker, place 6-7 ice cubes in the water.
- This beaker of freezing water will help determine the 0°C calibration on our thermometer.
- Set the other beaker on top of the hot plate and turn the hot plate up to 100°C (boiling point of water).
- Then thermometer is already calibrated

4.1.3How to calibrate your hygrometer

- Place a teaspoon of salt in a bottle cap or small cup and dampen it with a few drops of water (without dissolving it).
- Carefully place the wet salt and the hygrometer inside a see-through container and close tightly. ...

Let it sit for at least 6 hours and note the reading on the hygrometer without opening the container

4.1.4Why is calibration so important

Calibration defines the accuracy and quality of measurements recorded using a piece of equipment. Over time there is a tendency for results and accuracy to 'drift' when using particular technologies or measuring particular parameters such as temperature and humidity. To be confident in the results being measured, there is an ongoing need to maintain the calibration of equipment throughout its lifetime for reliable, accurate and repeatable measurements.



The goal of calibration is to minimize any measurement uncertainty by ensuring the accuracy of test equipment. Calibration quantifies and controls errors or uncertainties within measurement processes to an acceptable level.

4.1.5 How often to calibrate

Consider the cost of calibration as an investment and the potential results of an incorrect reading as the cost of not making the investment.

For most industries, the standard is to calibrate annually. As you gain results from calibration tests, you will be in a position to potentially adjust the frequency of calibrations, and/or upgrade to more robust measuring instruments if needed. Most calibration laboratories supply a printed calibration certificate for the customer to retain as proof of quality standards.

In summary, calibration is vitally important wherever measurements are important; it enables users and businesses to have confidence in the results that they monitor record and subsequently control.



Self-check 4	Written Test
---------------------	---------------------

I Say true or false the following questions (2 point each)

- 1 .Calibration defines the accuracy and quality of measurements recorded using a piece of equipment.
2. Calibration is often regarded as including the process of adjusting the output or indication on a measurement instrument to agree with value of the applied standard, within a specified accuracy
3. Calibration is the process of comparing a reading on one piece of equipment or system, with another piece of equipment that has been calibrated and referenced to a known set of parameters.

II Choose the best answer from the given alternatives (2point)

1. ----- is vitally important wherever measurements are important and it gives confidence for the user.

A. calibration B. accuracy C. hygrometer D. all

III Explain the following question briefly (2 point)

- 1 Explain the use of calibration for the measuring equipment. (2point)

Name ----- ID, NO-----

Satisfactory rating ≥ 5 point unsatisfactory rating ≤ 5 point



LG #32	LO 2 # Check products before transferred to the next operation
---------------	---

Instruction sheet
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p>
<p>LO2. Check products before transferred to the next operation</p> <ul style="list-style-type: none">• Carrying out all appropriate operational test in each unit operation• Recording data in accordance with enterprise procedure.• Identifying and reporting out of specification or typical result to appropriate person
<p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none">• Carry out all appropriate operational test in each unit operation• Record data in accordance with enterprise procedure.• Identify and report out of specification or typical result to appropriate personnel
Learning Instructions:

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP”.



Information sheet 1	Carrying out all appropriate operational test in each Unit operation
---------------------	--

1.1 Carrying out all appropriate operational test in each Unit operation

Laboratory testing is an important process, which relies on scientific analysis to identify problems with food products. It provides analytical data on the quality of a product or production process to support quality control in the HACCP system.

The objective of quality control is to identify contaminants in raw material, or contamination after a product is produced and before it is placed on the market. Additionally, laboratory testing is important for the research and development of new products, including, for example, the choice of ingredients or components, the design of food processing, shelf-life studies and sensory evaluation of products. This is the kind of information food scientists need when developing new products. Another benefit of laboratory testing is compliance with regulations for both the import and export of food products to different countries.

Food regulation is designed to protect public health and the safety of consumers. Therefore, food manufacturers must have traceability in their industry to ensure their food products are safe, with no contaminants or residues, and to provide accurate nutritional information.

❖ General laboratory testing of a manufacturer's product may include the following techniques:

- **Analytical chemistry testing:** The study of the separation, identification, and quantification of the chemical components of natural and artificial materials such as pH, additives, colors, contaminants, preservatives, minerals and trace elements, among others.
- **Food microbiology testing:** The study of the microorganisms that inhabit or contaminate food to help manufacturers assess the safety of raw materials,



components, ingredients and final products, thus guaranteeing the safety of food products. Testing for spoilage organisms and pathogens may be used to examine and prevent food poisoning outbreaks caused by food products and ingredients. This is important, as the whole supply chain may be contaminated in the process of food production.

- **Food nutrition analysis:** An analysis of value and the nutritional content in foods and food products. It provides information for nutrition labeling on food packaging that manufacturers are required to include complying with the labeling regulations of destination countries. Therefore, manufacturers and importers/exporters should be fully aware of the applicable laws and regulations of a country before offering their foods for distribution there.
- **Food allergen testing:** Food allergens are proteins that can appear in large quantities and often remain in food processing. The requirement is to find the target allergen in the ingredients and finished products. The allergens that must be tested for in food products include gluten in grains, peanuts, eggs, nuts, milk and soybeans.
- **Sensory testing:** Sensory testing is identification of food product properties by using the human senses (sight, smell, taste, touch and hearing) for the purposes of evaluating consumer products. In smell testing, olfactory receptors in the nose identify rancidity in a product. In tasting, the sensory organs on the tongue can identify the intensity of sweetness in food products.
- **Packaging Testing** A package no matter how attractive and functional it may be, fails if it is not able to get to its destination, there is the need, therefore to test them before using them. Package testing or packaging testing involves the measurement of a characteristic or property involved with packaging. This includes packaging materials, packaging components, primary packages, shipping containers, and unit loads, as well as the associated processes.

Testing measures the effects and interactions of the levels of packaging, the package contents, external forces, and end-use. It can involve controlled laboratory experiments,



subjective evaluations by people, or field testing. Documentation is important: formal test method, test report, photographs, video, etc. Testing can be a qualitative or quantitative procedure. Package testing is often a physical test. With some types of packaging such as food and pharmaceuticals, chemical tests are conducted to determine suitability of food contact materials..

**Self-check 1****Written Test****I Say true or false the following questions (2 point each)**

1. Sensory testing is identification of food product properties by using the human senses.
2. Food nutrition analysis is an analysis of value and the nutritional content in foods and food products.
3. A Field test report is expected from qualified laboratories.

II Choose the best answer from the given alternative. (2point)

1.....is the study of the microorganisms that inhabit or contaminate food.

A. Food microbiology testing B .Analytical test C. sensory testing D. all

II Explain the following question? (2 point)

1 What are the tests performed with in each unit operation? (2point)

Name ----- ID, NO-----

Satisfactory rating ≥ 5 point unsatisfactory rating ≤ 5 point



Information sheet 2	Recording data in accordance with enterprise Procedure
---------------------	---

2.1 Recording data in accordance with enterprise procedure

Maintenance and repair records contain information about each service performed on a piece of equipment, including make, model and location of the specific device, the date and time of the service provided, the name and title of the person who performed the service, a description of what was done, a list of parts installed in the course of the service, the status of the device after the service was completed, comments on the service performed or further service needed, the cost of the service (if applicable), and a signature of the equipment owner acknowledging that the service was received.

Photos can also be part of the record. Wherever possible, this service record should be linked to the national cold chain equipment inventory through the use of a unique identifier for the equipment item that appears on both the maintenance record and the inventory.

Analysis of equipment maintenance and repair records can help an immunization programme identify equipment models that require less maintenance and repairs, and have a longer economically viable lifetime. These models may be established as standard equipment models to help reduce the technical, procedural and training requirements of the equipment maintenance system.

Analysis of these records can identify:

- common problems based on enterprise requirement
- spare parts most frequently used by model;
- number of repair or maintenance activities performed in a month by administrative area;
- service histories of individual devices;
- equipment operator training needs; and



- Cost–effectiveness of equipment maintenance and repair services.

The maintenance team can use the maintenance and repair records to estimate the consumption of spare parts in order to predict order quantities and timing, track spare Parts prepare annual budgets and customize equipment user training materials. Records of the daily temperature monitoring of equipment should be included as part of the overall maintenance records for each piece of equipment.

Workplace information:

- batch/recipe instructions
- verbal or written operating procedures
- specifications: detailed description of design criteria for a piece of work
- production schedules

There are four sets of records that should be kept by the owner of a small confectionary processing unit. Keeping records is an investment of time and money and this must be related to the scale and profitability of the business (the benefits must outweigh the costs).

This means that the processor must understand why the information is collected and what it can be used for. Processors should also put in place a system of checks to ensure that one person does not have responsibility for a whole area of record keeping. For example the person who keeps records of ingredient purchases should be different to the person who records levels of stocks and manages the storeroom.



Table 1 shows the types of record.

Type of record	Information to be recorded
Production records	Recipes (bakery) Raw materials or ingredients received and suppliers' details Wastage % at different stages of the process Stock levels for each raw material and ingredient Production volumes and measurements Maintenance routines, details of spare parts kept in stock
Quality assurance records	Target amounts of ingredients and any changes made to recipe Measurements made at process control points Batch numbers and product code numbers Cleaning standards and schedules
Sales records	Names of customers and amounts sold to each Weekly and monthly sales volumes
Financial records	Income from sales Costs of all process inputs Staff records Cash flow Profit/loss Tax records Bank statements



Self-check 2	Written Test
---------------------	---------------------

I Say true or false the following questions (2 point each)

- 1 .Maintenance and repair records contain information about each service performed on a piece of equipment.
2. Keeping records is an investment of time and money and this must be related to the scale and profitability of the business (the benefits must outweigh the costs.
3. Processors should also put in place a system of checks to ensure that one person does not have responsibility for a whole area of record keeping.
4. Workplace information includes batch/recipe instructions.

II Explain the following question briefly

- 1 Explain the importance of keeping record. (2point)

Name ----- ID, NO-----

Satisfactory rating ≥ 5 point unsatisfactory rating ≤ 5 point



Information sheet 3

Identifying and reporting out of specification or typical result to appropriate personnel

3.1 Identifying and reporting out of specification or typical result to appropriate personnel

3.1.1 Technique of controlling out of specification

❖ Quality Control Checks

Quality control checks may be carried out at appropriate intervals to verify that equipment is functioning as expected. The procedures for quality control checks shall be included in the technical procedure for which the equipment is being used.

The following procedure is applicable for handling of out of specification results:

QC chemist shall report to QC In-charge, as and when he notices out of specification.

The analyst should retain the entire sample / standard solution.

QC In-charge shall initiate Phase I investigation as per the format given in the SOP

Initial results have to be reported along with the certificate of analysis and worksheets.

Then the investigation is to be done by QC In-charge for the following types of the OOS failure.

Laboratory: In laboratory, there are four possibilities for error

- **Clerical error:** Correction to be made according to clerical error, training shall be given to analyst. And release the material.
- **System failure:** Power failure / calibration failure check / any spillage or contamination in standard and sample / unsuitable instrument is used / instrument parameters set incorrectly.
- **Analyst failure:** Errors in dilution / Usage of appropriate and valid standard / method followed / sample stored appropriately / status of balance / Homogeneity of the sampling procedure / status of Instruments.



- **Sampling procedure failure:** Sample preparation method followed / sample taken is representative / sampling plan followed / sampling equipment's status
- the OOS result is recorded in the laboratory notebook with suitable explanation as part of the batch or process record.
- Repeat testing can be performed.
- This initial OOS result, demonstrated to be attributable to determinate error, is not considered in the final release of the material or process

. Log book for out of specification results:

- Serial no:
- OOS no:
- Date:
- Department:
- OOS details:
- Investigation details:
- Signature of QA:
- Remark

Out of specification investigation and reporting form form
format no.: sop/ QA /XXXX/F/1

Table 2 out of specification result reporting format.

Parameter	Limit (Spec. No)	Actual	Result
			Pass / Fail
			Pass / Fail
Attachement:	First CoA with	Work sheet	



Self-check 3	Written Test
---------------------	---------------------

I Say true or false the following questions (2 point each)

1. Quality control checks may be carried out at appropriate intervals to verify that equipment is functioning as expected.
2. Log book for out of specification results include only date.
3. Out of specification result, demonstrated to be attributable to determinate error, is not considered in the final release of the material or process.
4. In the laboratory, there are possibilities for error.

II Explain the following question briefly (2point)

1. How out of specification results occur?

Satisfactory rating ≥ 5 point unsatisfactory rating ≤ 5 point



Operation sheet 1

Apply sensory evaluation on confectionary/candy

Procedure:

1. Identify the selected environment
2. prepare product that is evaluated by our sense organ
3. Check which sense organ is used to evaluate
4. Apply candy testing and record testing result.



Operation sheet 2	Calibrate thermometer
--------------------------	------------------------------

Procedure:

Step 1 Fill two beakers with distilled water about two-thirds of the way full.

Step 2 Place 6-7 ice cubes in the beaker

Step 3 Determine the 0°C calibration on our thermometer.

Step 4. Set the other beaker on top of the hot plate and turn the hot plate up to 100°C (boiling point of water).

Step 5 the freezing point at 0°C and boiling point of water at 100°C gives the correct calibration of the thermometer.

Step 6 Then thermometer is already calibrated.



Operation sheet 3	Calibrate hygrometer
--------------------------	-----------------------------

Procedure:

1. Place a teaspoon of salt in a bottle cap or small cup and dampen it with a few drops of water (without dissolving it).
2. Carefully place the wet salt and the hygrometer inside a see-through container and close tightly.
3. Let it sit for at least 6 hours and note the reading on the hygrometer without opening the container.
4. Final reading above 75 % reading of hygrometer shows correct calibration of hygrometer.



LAP TEST	Performance Test
----------	------------------

Name.....

ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2 hour for each. The project is expected from each student to do it.

Task1: Apply sensory testing on candy.

Task: calibrate thermometer.

Task 3: Calibrate hygrometer



Reference

M.P. Doyle, K.L. Ru off, M. Pierson, W. Weinberg, B. Soule and B.S. Michaels, (2000)

Reducing transmission of infectious agents in the home: Part I. Sources of infection

Didier, T. (2004) Traité de santé publique, Paris, Flammarion. FAO/WHO (2003)

Food and Agriculture Organization of the United Nations (FAO), Rome. FAO (2004),

Department of Food Science, Agriculture University, Wageningen,

Holland. British Standard BS 3406: Part 5. 1983. British Standard Methods for Particle Size Distribution. Part 5. Recommendations for Electrical Sensing Zone Method (the

London. Coulter, W. H. 1956. Proc. Nat. Elect. Conf 12, 1034 (Coulter Counter® is a registered trademark of Coulter Electronics Inc.)

Berkeley Electronics Research Laboratory Memorandum M91/33,1991.

[12] Book of SEMI Standards, Volume 2: Equipment Automation, Semiconductor Equipment and Materials Institute Inc, 1987.



ACKNOWLEDGEMENT

We wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM). We would like also to express our appreciation to the TVET instructors and respective industry experts of Regional TVET bureau TVET College/ Institutes, Federal Technical and Vocational Education and Training Agency (FTVET) who made the development of this Teaching, Training and Learning Materials (TTLM) with required standards and quality possible. This Teaching, Training and Learning Materials (TTLM) was developed on BISHOFTU SEP2020



No	Name	Qualification	Educational background	Region	E-mail
1	Teshale Besufikad	B	Food science and post-Harvest Technology	Sidama	teshu44@gmail.com
2	Memiru Michael	B	Food Process Engineering	A.A	Lijelshaday@gmail.com
3	Zerfu Negash	B	Hotel mgmt.	Oromia	nzerfu@gmail.com
4	Meseret Niguse	B	Hotel & Tourism mgt	Oromia	mimimesi@gmail.com
5	Cheru petros	B	Food technology and process engineering	SNNPR	Chupeter143@gmail.com
6	Zelalem Taye	A	Leadership and Management	Amhara TVEDB/coordinator	Tayezelalem22@gmail.com