



CONFECTIONARY PROCESSING

Level-II

**Based on May 2019, Version 2 Occupational
Standards**

**Module Title: - Operating a dough mixing
Process**

LG Code: IND COP2 M12 (LO1-3) LG (38-40)

TTLM Code: IND COP2 TTLM 01020v01

October 2020



Table Contents

LO #1- Prepare the dough making equipment and process for operation 4

 Instruction sheet 4

 Information Sheet 1- Confirming and make available materials and service 5

 Self-check 1 14

 Information Sheet 2- Weighing or measuring recipe ingredients 16

 Self-check 2 20

 Information Sheet- 3 Identifying and confirming the cleaning and maintenance.. 21

 Self-check 3 24

 Information Sheet- 4Fitting and adjusting the materials handling, mixing.....

 /blending equipment 25

 Self-Check 3..... 27

 Information Sheet- 5: Entering the Process/operation parameters to meet safety 28

 Self-check 5 31

 Information Sheet- 6 32

 Checking and adjusting the equipment performance..... 32

 Self-Check -6 36

 Information Sheet- 7 Carrying out the Pre-start checks 37

 Self-Check – 7..... 40

 Operation Sheet-1 Mise-en-place preparation Dough making process 41

 Operation Sheet-2 41

 LAP TEST 42

LO #2- Operate and Monitor the dough mixing process..... 43

 Instruction sheet 43

 Information Sheet 1- Starting and operating the process in the workplace..... 44

 policies and procedures..... 44

 Self-check 1 48

 Information Sheet 2- Introducing the flavors to the mixing process 49

 Self-check 2 51

 Information Sheet- 3 52

 Monitoring the equipment to identify the variation in operating conditions..... 52



Self-Check – 5..... 54

Information Sheet- 4 55

Identifying, maintaining and reporting the Variation of equipment operation 55

 Self-Check – 6..... 56

Information Sheet- 5 Monitoring the process of dough to meets specifications 57

 Self-check 5 59

Information Sheet- 6 dentifying, rectifying and/or reporting the out-of specification60
l production/processing outcomes in the workplace. 60

 Self-Check –6..... 63

Information Sheet- 7 Transferring the finished dough..... 64

 Self-check 7 68

Information Sheet- 8 Maintaining the work area according to housekeeping... 69

Standards 69

 Self-check 8 71

Information Sheet- 9: Conducting the work in accordance with guidelines 71

 Self-Check 9..... 75

Information Sheet 10 Maintaining the workplace records 76

 Self-Check 1..... 79

Operation Sheet-1 Starting and operating dough process..... 80

LAP TEST..... 81

LO #3- Shutdown the dough process 82

 Instruction sheet 82

 Information Sheet 1- 83

 Identifying the appropriate shutdown procedure 83

 Self-check 1 86

 Information Sheet 2- shutting down the process according to workplace
 procedures..... 87

 Self-check 2 88

 Information Sheet- 3 Identifying and reporting maintenance requirements..... 89

 Self-check 3 90

 Operation sheet 1 91

 Shut down mixer..... 91

 LAP TEST..... 92

Reference 93



AKNOWLEDGEMENT 94

Instruction sheet	
LG #15	LO #1- Prepare the dough making equipment and process for operation
<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"> • Confirming and make available service • Weighing or measuring recipe ingredients • Identifying and confirming the cleaning and maintenance • Fitting and adjusting the materials handling, mixing/blending equipment and related attachments • Entering the Process/operation parameters to meet safety • Checking and adjusting equipment performance • carrying out the Pre-start checks <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"> • Confirm and make available service and materials • Weigh or measure recipe ingredients • Identify and confirm the cleaning and maintenance • Fit and adjust the materials handling, mixing/blending equipment and related attachments • Enter the Process/operation parameters to meet safety. • Check and adjust equipment performance • carry out the Pre-start checks 	
Learning Instructions:	
<ol style="list-style-type: none"> 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 test”

Information Sheet 1-

Confirming and make available materials and service

1.1. Confirming and make available materials

Ingredients are something that enters an element into mixture. For example Cake is a baked batter made from major and minor ingredients. These ingredients are listed as the following:

- flour
- sugar
- salt
- leavening agents
- shortening, milk
- Eggs and flavoring.

1.1.1. Essential Ingredients for dough

a) Wheat Flour

Flour furnishes structure in cakes and is used to hold the other ingredients together . In general, cake flours are milled from soft wheat's of low protein content. The role of wheat proteins in cake making is much less prominent than that in bread production. Low protein wheat's provide weak quality gluten desired in cakes. A good cake flour would have low protein content varying from 7.0% to 8.5% depending on the type of cake being prepared. Thus, high quality batter type cakes may be obtained from flour containing 8.0 to 8.5% protein, whereas foam-



type cakes are best prepared from flours of protein level below 8.0%.



Fig 1. Wheat Flour

b) Sugars

Sugars are used primarily as sweeteners in cakes as well as in other sweet goods. In cake making, sugar also has a softening effect on the gluten in flour, resulting in tender texture. Sugars also fasten the rate of caramelization of the batter, allowing the cake crust to color faster and thereby retain moisture in the baked cake. Sugar therefore contributes to texture, moistness and color in cakes as well as sweetness and richness.



Fig 2. Sugar

c) Fats

Fats are the primary enriching ingredient in cakes.



The functional properties of fats with respect to cake making lie in its

- Shortening
- creaming
- Emulsifying effects on cake batters.

Fat distributed in a cake batter prevents the formation of a gluten structure, producing what is known as shortness, and results in tenderness in cakes. The creaming ability of fat is, its ability to entrap air, is a very important factor in the production of good volume and texture in cakes. The emulsifying property of fat determines how much liquid can be incorporated in a batter without the occurrence of curdling. The more liquid can be added to a cake batter, the more sugar will the batter be able to hold dissolved in the liquid.



Fig 3. Fats

The types of fats available for cake making are:

- ✚ **Butter:** Butter is an emulsion of the water-in-oil type and consists chiefly of the fat of milk or butter fat together with curd, milk sugar, mineral salts, and about 14% water. It is obtained by churning the ripened cream of cow's milk. Butter is known for the distinctive flavor it imparts to baked products, but its creaming and emulsifying properties are inferior to other cake fats.
- ✚ **Margarine:** Margarine is a fat resembling butter and is an emulsion of edible oils and fats with ripened milk. Its composition is similar to that of



butter but it lacks the characteristic flavor of butter. Cake margarine usually has good creaming and emulsifying properties.



Fig 4. Margarine



- ✚ **Shortenings:** Shortenings are white or yellow fats for the most part from vegetable oils, refined and hardened. They are virtually 100% fat. Shortenings were first called compound fats because they are normally made from refined coconut oils, palm-kernel oil, cotton seed oil and other also have very good creaming properties and for this reason are commonly used in cakes as well.
- ✚ **Vegetable oils:** These are blends of oils from vegetable sources refined in the same way as shortening. They differ only in that they are liquid at normal temperature. Vegetable oils are used mostly in chiffon cake production.

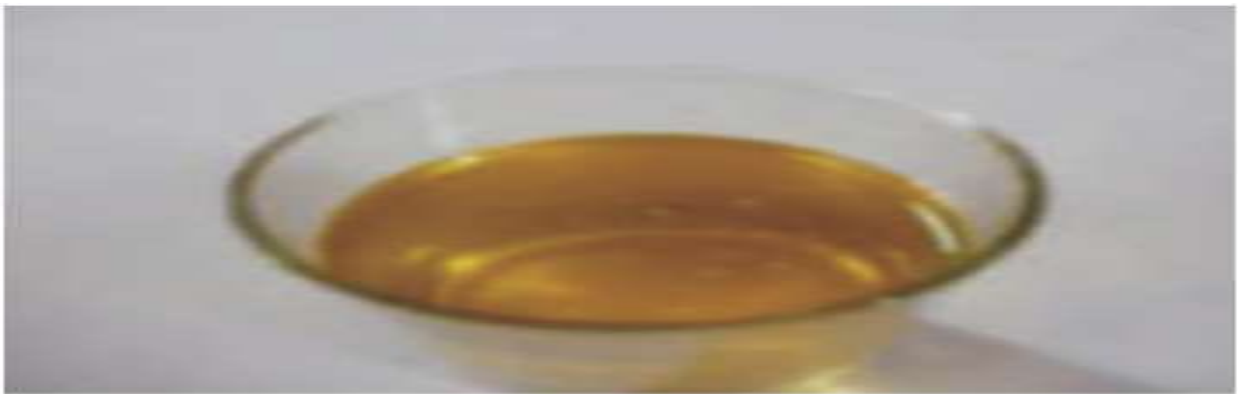


Fig 5. Oil

- ✚ **Lard:** Lard is fat separated from the fatty tissues of pigs by rendering. Pure lard does not cream up well by itself but lard can now be processed which does have fairly good creaming property.

Quality cakes depend on the use of ingredients which is:

- High quality
- Proper mixing and panning methods
- Correct batter temperature



- Correct baking time and temperature and other factors

Cake formulas can be classified into two main types, depending upon differences due to batter appearance or character . They are:

1. **Batter Type cake:** These cakes depend on eggs. Flour, and milk for structure and contain reasonably high percentages of fat. Much of the volume of the finished cake is achieved by the use of baking powder. Examples are butter cake, pound cake, layer cake, fruit cake etc.
2. **Foam Type Cakes :**These cakes depend principally upon the extension and denaturation of the egg protein for the bulk of the structure of the finished volume, and with one or two exceptions, can be regarded as shortened cakes or cakes without shortening.

1.2. Equipment for making dough

Machines or Equipment, including e.g. hand tools or trays, for preparing, shaping and processing edible dough, namely for mixing, kneading, dividing, working, forming, shaping, cutting, proving, handling the dough before the baking, cooking or prebaking process with optional subsequent freezing.

Many small-scale bakers buy the equipment that is immediately available and don't look carefully at the alternatives. This can lead to them selecting an inappropriate machine.

To maximize efficiency of production, the capacity of each piece of equipment should be matched to the others. This prevents money being wasted on a machine that is larger than necessary, or creating 'bottlenecks' caused by one piece of equipment that is too small.

1.2.1. Types of equipment

The basic equipment needed in all bakeries and confectionaries are:



- a mixing bowl
- containers for dough or batter
- Hand tools such as spoons, jugs etc. and an oven.
- The smallest scale of production manual operation will be inefficient, hard work and unprofitable.
- weighing scales
- moulder
- electric dough mixer
- dough divider (for cutting pieces of dough of equal weight)
- oven
- Prove
- work tables

At a larger scale of production, the following additional equipment is also used:

- ball moulder (or 'umbrella' moulder) used for preparing dough into ball shapes
- biscuit moulder for pressing or cutting biscuit dough into required shapes
- mechanical dough divider
- pastry brake for rolling pastry dough into progressively thinner sheets
- conveyor belts to transport dough or baked goods between different stages in a process

1.2.1.1. Mixer

When selecting a mixer it must have the following features:

- ability to mix different types of product
- sufficient capacity to meet the intended rates of production
- hygienic design in which no oil or grease from the motor/gearbox can contaminate the product
- good mixing efficiency to produce an acceptable product in a short time with minimum energy consumption



- adequate safety features to protect operators from trapping their hands in the mixer or receiving electric shocks
- mixing bowls should have a smooth internal surface without corners, and all welds should be ground to a smooth finish



Fig.6 mixing equipment's

1.3. Services

Water is present in sufficient quantity in cake batters to dissolve sugar, salt and other solid ingredients. Water adds moisture to the finished cakes and also regulates the consistency of the batter. It develops the protein in the flour to a very limited extent in order to retain better the gas produced by baking powder in the cake formula.



Fig.7 ingredients

❖ **Confirming and make available Services**

a) Lighting and power

Where lighting is needed, florescent tubes use less electricity than bulbs, but care is needed when using fluorescent lights above mixer/blender and other equipment that has moving or rotating parts. This is because they can make machinery appear stationary at certain speeds, causing a hazard to operators.

Electricity is preferred for bakery ovens because it is clean, flexible and easily controlled. Electric motors should be fitted with isolators and starters. Plugs should be fitted with fuses that suit the power rating of the equipment and the main supply should have an earth-leakage trip switch. All electric wiring should be of the correct type for the intended purpose and installed by a qualified and competent electrician.



Where a three-phase (440 volt) supply is used in larger mixer, the load should be equally spread over the three phases.

b) Water supply and sanitation

Water is used in bakeries to make dough and for washing equipment. An adequate supply of potable (safe for drinking) water should be available from taps in the processing room.

There are two potential problems with the water quality: sand and contaminating

Self-check 1	Written test
---------------------	---------------------

microorganisms.

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. Which of the following is not confectionary equipment's?
 - A. mixer
 - B. biscuit moulder
 - C. baking sheet
 - D. none of the above

2. What types of service we available to make dough?
 - A. Water
 - B. Light
 - C. Electrical power
 - D. All

3. When selecting a mixer you must have the follow?
 - A. ability to mix different types of product
 - B. sufficient capacity to meet the intended rates of production
 - C. hygienic design in which no oil or grease from the motor/gearbox
Can contaminate the product



D. All of the above

Test II: Short Answer Questions

1. What is purpose of mixer?
2. List all the basic equipment needed in confectionaries.
3. Why you make available equipment?

Answer Sheet

Score = _____
Rating: _____

Note: Satisfactory rating - ≥10 points

Unsatisfactory - below 10 points

Name: _____

Date: _____



Information Sheet 2- Weighing or measuring recipe ingredients

2.1. Weighing or Measuring Recipe Ingredients

Measuring is defined as finding out the exact dimensions or quantity of something. Success in food preparation depends on using the correct amount of ingredients as stated on the recipe. The only way to get the correct amount is by measuring or weighing each ingredient – a guess won't be accurate!

Equipment to measure volume includes:

- Measuring spoons
- Dry measuring containers
- Liquid measuring containers

Fig. measuring utensils



❖ Measuring equipment's:

Scales should be calibrated. Handle scales by the base to maintain accurate readings. Types of scales:

- Traditional scales may also be called portion or pound scales.
 - Range of capacity is typically 2 to 50 pounds.
 - Dials may be fixed (stationary) or adjustable.
 - If dial is fixed, place the container on the platform and record the weight of the container before adding ingredients to be weighed.
 - If dial is adjustable, place the container on the platform and turn the pointer to 0, then add ingredients until required weight is reached.



❖ **Electronic scales:**

- Need an electric or battery source.
- Range of capacity is typically 10 to 50 pounds.
- The tare button allows you to return the scale to zero weight after placing the container on the scale.
- As an option, place the container on the scale before you turn it on and it



will automatically tare to zero.

Fig. Electronic scales

- ✓ We measure all of our ingredients (including liquids) in grams on a scale. Scaling is much faster and more accurate than working in volume.

❖ **The Correct Way to Measure/Weigh Ingredients**

It is important to follow the correct technique for measuring and weighing. Weigh and measure your ingredients for a recipe before combining. This is your mise en place, meaning all your ingredients are in place before you start preparing and cooking



❖ **Weighing/Measuring Techniques:**

- It is more accurate and easier to use a scale to weigh ingredients, especially dry ingredients. Dry ingredients – spoon or scoop ingredient lightly into spoon or cup, and then level top with flat surface.
- Liquid ingredients – fill measuring container and then place container on a level surface. Use your eye to be sure the bottom of the liquid curve (this is called the meniscus) is at the appropriate measure
- If a fixed dial, weigh the container you plan to use to weigh food. Use a permanent marker to write the weight of the container on the bottom of the container so you do not have to do this step again.
- If an adjustable dial, place container on the scale, then “tare” the scale by moving the dial indicator to the zero mark. If using an electronic scale, simply press the “tare” button to zero the scale.
- Follow the recipe carefully to weigh and measure with precision.
- Accuracy is very important when weighing ingredients and helps the school chef produce consistently fabulous foods every time.
- How to measure wet and dry ingredients for the best results when you're baking
- Proper measuring is a crucial part of successful baking.



Fig 1. Measuring/weighing equipment's

Wet ingredients, such as milk, water, eggs (if you're measuring eggs by volume) or oils can technically be measured in either wet or dry measures—one dry measuring cup of milk should weigh exactly the same as one wet measuring cup of milk. However, a dry measuring cup must be filled to the brim for accuracy, which can make measuring liquids in them impractical. Likewise, dry ingredients can be measured in a liquid measure, but it is very difficult to accurately level dry ingredients without a straight brim

The ingredients you used could be the culprits – using different sugars, melted butter, baking powder or baking soda can alter a cookie's texture and taste.

❖ **The most important Cookies Ingredients are:**

- Granulated Sugar.
- Brown Sugar.
- Melted Butter.
- Baking Powder.
- Baking Soda and Chilling Dough for 24 Hours



Self-check 2	Written test
--------------	--------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. What is the advantage of measuring?
 - A. To correct amount of ingredients as stated on the recipe.
 - B. To guessing weigh amount of ingredients.
 - C. To decrease productivity.
 - D. None of the above.
2. Which of the following are to measure dry ingredients?
 - A. Digital scale B. spoon C. cup D. All
3. Equipment to measure volume includes:
 - A. Measuring spoons
 - B. Dry measuring containers
 - C. Liquid measuring containers
 - D. All of the above



Test II: Short Answer Questions (2points each questions)

1. Describe the advantages of weighing or measuring
2. Write types of measuring equipment's.

Answer Sheet

Score = _____

Rating: _____

Note: Satisfactory rating - ≥5 points

Unsatisfactory - below 5 points

Information Sheet- 3

Identifying and confirming the cleaning and maintenance

Name: _____

Date: _____

3.1. Identifying and confirming the cleaning and maintenance

3.1.1. Identifying and confirming the cleaning

Pre cleaning, by removing heavy accumulations of soil and debris with appropriate tools, will save water during later washing operations. Effective cleaning to eliminate invasive species materials and prevent their spread can be accomplished by thoroughly removing soil and debris using pressurized water. In certain situations, cleaning with compressed air, rather than water, could prevent damage to certain equipment areas such as engine wiring systems and vehicle cabs.

• During confirming the cleaning:

- ✓ Workshop should be kept neat and tidy.
- ✓ Work areas and equipment are to be thoroughly cleaned.
- ✓ Ensure that gangways, access routes and exit ways to fire exits are kept clear.
- ✓ Keep access to fire and emergency equipment clear at all times. Fire doors must never be locked or be difficult to open.



- ✓ Keep gangways and exit ways clear of rubbish; do not use them as storage area even on a temporary basis.
- ✓ Avoid tripping hazards such as boxes, trolley handles, trucks and materials

3.1.2. Frequency of cleaning

Once you have established which items and surfaces need to be cleaned, we then need to decide how often these areas will need to be cleaned.

The following terms must be understood when defining frequency:

- a. Daily clean** - These are tasks that need to be done at least once daily. Some areas and items will need to be cleaned several times per day e.g. Public toilets
- b. Task of the day** - The supervisor may instruct you on a specific task of the day that requires extra attention e.g. you may be instructed today to clean all door frames and their surrounds whilst tomorrow you may need to pay special attention to all chair legs. This ensures that all miscellaneous tasks are attended to, as and when needed
- c. Weekly clean** - These are areas or items that need to be cleaned weekly. This may be scheduled on certain days of the week
- d. Team Cleaning** - This means that there will be a team of people each with their own task working in the same area at once e.g. In a public toilet area one person would clean all the toilet cubicles whilst another will clean all the wash hand basins followed lastly by somebody to clean all the floors. Team cleaning is rare in hotels but in large entertainment venues or offices, this practice is common.

3.2. Maintenance

Maintenance is the upkeep of all furniture, fittings and equipment to an exacting standard within the property so that all areas look consistently new and pristine.

❖ Basic types of maintenance

A. Corrective maintenance

Page 22 of 96	Federal TVET Agency Author/Copyright	TVET program title- confectionary processing Level -2	Version -1 October 2020
---------------	---	--	----------------------------



: Maintenance is carried out following detection of an anomaly and aimed at restoring normal operating conditions. This approach is based on the firm belief that the costs sustained for downtime and repair in case of fault are lower than the investment required for a maintenance program. This strategy may be cost-effective until catastrophic faults occur.

B. Preventive maintenance

Maintenance carried out at predetermined intervals or according to prescribed criteria, aimed at reducing the failure risk or performance degradation of the equipment. The maintenance cycles are planned according to the need to take the device out of service. The incidence of operating faults is reduced.

A. Risk-based maintenance

Maintenance carried out by integrating analysis, measurement and periodic test activities to standard preventive maintenance. The gathered information is viewed in the context of the environmental, operation and process condition of the equipment in the system. The aim is to perform the asset condition and risk assessment and define the appropriate maintenance program.

B. Condition-based maintenance

Maintenance based on the equipment performance monitoring and the control of the corrective actions taken as a result.

The real actual equipment condition is continuously assessed by the on-line detection of significant working device parameters and their automatic comparison with average values and performance. Maintenance is carried out when certain indicators give the signaling that the equipment is deteriorating and the failure probability is increasing. This strategy, in the long term, allows reducing drastically the costs



associated with maintenance, thereby minimizing the occurrence of serious faults and optimizing the available economic resources management.

Self-check 3	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

Test –I match column “A” with column “B”.

A

B

___ 1. Daily cleaning
periodic

a. integrating analysis, measurement and

___2. Risk based maintenance

b. predetermined intervals



___3. Preventive maintenance

c. scheduled on certain days of the week

___4. Weekly cleaning

d. at least once daily

Test II: Short Answer Questions

1. What is the meaning of Cleaning?
2. List all basic types of maintenance.

Answer Sheet

Score = _____

Rating: _____

Note: Satisfactory rating ≥ 5 points

Unsatisfactory - below 5 points

Name: _____

Date: _____

Information Sheet- 4	Fitting and adjusting the materials handling, mixing /blending equipment
-----------------------------	---

4.1. Fitting and adjusting the materials handling, mixing /blending equipment

Fitting is the process of applying craft methods such as skilled filing to the making and assembling of machines or other products. Fitting means ready, appropriate, or in keeping, whereas proper means suited or acceptable to the purpose or



circumstances. Fitting is also noun with the meaning: a small part, especially a standardized or detachable part of a device or machine.

Check to ensure accuracy and dependable operation of the proposed equipment and methods prior to the start of dough operations and after making any changes in the location or arrangement of the mixer/blender equipment. Plant calibration is the responsibility of the Producer.

Check the general layout of the plant before the equipment is erected to ensure efficient operation and adequate space for stockpiling and handling materials in compliance with specification requirements. Whenever possible, avoid the arrangement and erection of batching plants in congested locations which are not conducive to proper handling of materials. Small stockpiles result in segregation and non-uniformity of materials and very poor control of the concrete. Once mixer/blender equipment is erected in such a location, it is difficult to improve conditions.

Experience has demonstrated that the most uniform concrete is produced when the mixer/blender equipment is favored by adequate space for the maintenance of large stockpiles of materials.

When fitting or adjusting the equipment's follow the following points:

- A. Check for partially collapsed lines, leaks, or restrictions that would divert or otherwise hamper the flow of water to the meter.
 - B. Inspect gears, pivots, etc., for excessive wear.
 - C. Check legibility of dials, numerals, and pointers.
 - D. Correct any problems noted above before proceeding.
- All power transmission components are shielded by screw fastened guards, in compliance with the EN 593 standard.
 - Safety grille which prevents access to the bowl during the work process.



- Safety guard for the electrical system



Fig. Fixed and moveable guards

Self-Check 3	Written Test
--------------	--------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer



1. When fitting or adjusting the equipment's you must check?
 - A. Check for partially collapsed lines, leaks, or restrictions that would divert
 - B. Check legibility of dials, numerals, and pointers.
 - C. Correct any problems noted above before proceeding
 - D. All

Test I: fill in blank space

1. _____ is the process of applying craft methods such as skilled filing to the making and assembling of machines or other products
- 2.

Answer Sheet

Score = _____
Rating: _____

Note: Satisfactory rating ≥ 4 points

Unsatisfactory - below 4 points

Name: _____

Date: _____

Information Sheet- 5: Entering the Process/operation parameters to meet safety

5.1. Entering the Process/operation parameters to meet safety

Dough mixing is a process in which flour and water are mixed until gluten is developed, a result of the enhanced interaction between dispersed and hydrated



gluten-forming proteins. It's quite different from batter due to differences in their respective formulations—specifically, the proportion between dry and liquid ingredients.

Dough mixing is an important stage in the confectionaries making process, because the amount of mixing has a critical bearing upon final production quality. Decisions with respect to adequacy of dough mixing are still partly based on operator experience. The physical and chemical reactions occurring during dough development are related to complex mechanisms involving the wheat proteins and water molecules.

The goal is to:

1. Incorporate air
2. Hydrate dry ingredients
3. Homogenize the dough by evenly distributing all the ingredients
4. Knead the dough
5. Develop the gluten



Fig. 1 Dough mixing process



5.1.1. To meet dough Parameter

Perhaps the most striking element of the mechanisms used to control mixers currently is that the majority are based on parameters that may be measured relatively easily (e.g. time, energy input) rather than the parameters widely accepted in small-scale studies of dough quality (e.g. time to peak mixer torque).

5.1.2. Aspects that influence dough handling properties

- Wheat class used at the mill (% extraction)
- Hydration (water absorption)
- Percentage of functional polymers (i.e. arabinoxylans, gluten-forming proteins, damaged starch)
- Quality of gluten-forming proteins (glia dins and gluten ins)
- Presence of bran particles (exerting a cutting or disrupting action on the gluten matrix)
- Presence of some non-wheat cereal flours
- Mixing conditions (rpm, work input, mix time)
- Over mixing/under mixing
- Degree gluten development
- Dough temperature
- Presence of water-competing ingredients (e.g. sugars, salt, egg proteins) that limit the hydration of functional polymers
- Addition of functional ingredients, such as oxidizing and reducing agents
- Length of dough resting period

5.1.2. Procedures of dough mixing



1. Flour and other ingredients are mixed with a flavor additives suspension to form dough.
2. The dough is mixed until it reaches optimum dough development.
3. The dough is rounded and placed into a fermentation cabinet at 30°C and 85% relative humidity for 105 minutes.
4. First Punch – The dough is passed through a sheeter, folded twice, and returned to the fermentation cabinet for 50 minutes.
5. Second Punch – The dough is passed through a sheeter, folded twice, and returned to the fermentation cabinet for 25 minutes.
6. The dough is molded into a cylinder shape and proofed in a pan for 62 minutes.
7. The dough is baked in a 215°C oven for 24 minutes and then cooled to room temperature

Self-check 5	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers



Test I: Say “True” or “False”

1. Dough mixing is a process in which flour and water are mixed until gluten is developed.
2. During the process to safe and clean equipment and work area is not necessary
3. Quality of gluten-forming proteins

Test -II Give short answer for the following

1. Write the process of dough making.
2. What influence dough handling properties

Answer Sheet

Score = _____

Rating: _____

Note: Satisfactory rating ≥4 points

Unsatisfactory - below 4 points

Name: _____

Date: _____

Information Sheet- 6	Checking and adjusting the equipment performance
----------------------	--

6.1. Check and adjust equipment performance Condition



Poor operational practice is also one of the main causes of problems on treatment plants. It is imperative that operators understand why they are performing certain tasks and what the consequences are if the tasks are not carried out as prescribed. It is the responsibility of a treatment plant manager to ensure appropriate training of the operating staff

Lack of maintenance is the most common reason for plant failure. Mechanical equipment requires regular attention to ensure problem-free operation. Maintenance schedules must be strictly carried out. Good housekeeping and keeping equipment, buildings and civil structures clean and tidy go a long way to minimize operational problems. Work area, materials, and equipment are routinely monitored to ensure compliance with purification requirements.

Materials handled and stored need to be checked can include:

1. Gather the tools to clean in the designed area for cleaning.
2. Segregate the tools according to the kinds of dirty they have.
3. Submerge the tools in the washing pan.
4. Use paint brush to remove the dirty from the tools.
5. Get the tools from the washing pan and wipe them with rags until dart.
- 6.. Clean and keep all materials used for cleaning

6.1.1. Basic operating principles of equipment, such as

- main equipment components
- status and purpose of guards, equipment operating capacities and applications
the purpose and location of sensors and related feedback instrumentation

Condition Monitoring has historically focused on the acquisition and analysis of measurable parameters that would give useful information as to the condition of machine components and, hence, a forecast of the likely serviceability of the machine.



The wider view of Condition Management must take into account and report on excursions away from previously defined acceptable tolerances

- the performance of the machine
- or the system of which it is a part

6.1.2. The Purpose of Performance Monitoring

There is the classic story of the condition monitoring technician who completed a vibration survey on a pump after it was reported as running erratically. He reported that the pump had the lowest vibration levels ever measured and it was therefore in perfect condition.

Applications for Machinery Performance Monitoring Machines and Systems for which Performance Monitoring surveys may be required on a routine basis include the following items:

- Pumps – due to impeller wear, seal ring wear (re-cycling) or blockage.
- Fan Systems – due to filter blockage, blade fouling or re-cycling.
- Boilers – due to loss of thermal efficiency for many different reasons.
- Heat Exchangers – due to fouling or blockage.
- Steam Turbines – due to blade fouling and numerous other reasons.
- Air Compressors – due to wear, filter blockage, valve leakage (reciprocating), etc.
- Diesel or Gas Engines – due to loss of compression (rings or valve leakage) etc.
- Electrostatic or bag dust filters – due to fouling, shorting or leakage.



6.1.3. Condition Monitoring and Process Analysis

Most machine and process characteristics which affect

- ✚ availability
- ✚ capacity
- ✚ quality
- ✚ safety
- ✚ Risk and cost can be continually evaluated throughout an asset’s lifetime.

This is essential in identifying impending failure and will be applied to critical areas identified in the reliability plan.

The current state-of-health of process plant is important information related to current information, diagnosis and prognosis of various defects, and predicted useful life in the optimization of safety, quality and high production rates.

There are the obvious functions of monitoring and controlling the process for reasons of safety and product specification. Additionally, there is invaluable information to be gained from the process parameters that can give an understanding of the current health of the asset.



Self-Check -6	Written Test
----------------------	---------------------

Name: _____ ID.NO. _____ Date: _____

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Test I: Choose the Best Answer

1. The wider view of Condition Management must take into account _____?
 - A. the performance of the machine
 - B. the system of which it is a part
 - C. And report on excursions away from previously defined acceptable tolerances
 - D. All

2. One great benefit of performance monitoring electric motors is _____?
 - A. to identify the frequency
 - B. And number of times that they are overloaded
 - C. A and B are Answers
 - D. none

Answer Sheet

Score = _____
Rating: _____



Note: Satisfactory rating ≥ 4 points

Unsatisfactory - below 4 points

Name: _____

Date: _____

Information Sheet- 7	Carrying out the Pre-start checks
-----------------------------	--

7.1. Carrying out pre-start checks

It is important to carry out a series of checks before using a piece of machinery. This is particularly important in situations in which a number of people use the same machine. Larger companies and organizations usually have a system of checks, and a maintenance department that will deal with reported defects. Individuals working alone or in small teams will be responsible for checking and maintaining their own machines. Operator should be able to follow a checklist to ensure that they complete all the necessary checks

Prestart checks must be made to ensure equipment is not damaged on startup and also to prevent possible injury to personnel during start up, the operational status of safety systems must be checked. Check that equipment is plugged in correctly

A pre-start inspection involves a routine examination of a piece of equipment by its operator that is standardized via a checklist. Whether it be a light vehicle, heavy vehicle, mobile plant or tools, pre-start inspections are an important task with financial, and more importantly, safety implications.

In many industries involving the use of potentially dangerous equipment, it is standard procedure to conduct pre-start inspections. A pre-start inspection involves a routine examination of a piece of equipment by its operator that is standardized via a checklist. Whether it be a light vehicle, heavy machine, mobile plant or tools, pre-start inspections are an important task with financial, and more importantly, safety implications. Pre-start inspection can potentially be the difference between life and death.





7.1.1. Pre-start Benefits

The main goal of regular pre-start inspections is to protect people. Industrial equipment such as various tools, mobile plant, light vehicles and heavy vehicles have the potential to cause serious injury and death if they aren't maintained properly, so regular pre-start inspections form the foundation of their maintenance program and workplace safety. Often it is the small, unseen items that go unnoticed, but by implementing a thorough pre-start checklist all of these aspects can be inspected.

Another key factor for pre-start inspections to be effective; any issues identified need to be address by workers or reported to the relevant person within an organisation (fleet manager, supervisor, etc.) so that they can be adequately addressed. If pre-start inspection checklists are simply filed away and not actioned on then they are of no benefit.

Pre-start inspections for industrial equipment is extremely important, they form the basis of equipment maintenance programs and also an organisation or site's safety program. As an additional benefit to the safety aspect, pre-starts also have financial advantages, helping to identify any issues before they become major and costly while also minimizing downtime.



Self-Check – 7	Written test
-----------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Test I: Choose the Best Answer from the following Choices (3points)

1. A pre-start inspection involves?
 - A. routine examination
 - B. After the work done check the equipment's.
 - C. prevent possible injury
 - D. All are Answers
 - E. Except "B"

Test- II Say "True" or "False" for the following questions (3points)

1. Pre-start inspections are not important for industrial equipment.

Answer Sheet

Score = _____
Rating: _____

Note: Satisfactory rating – 3 points Unsatisfactory - below 3 and 4 points

You can ask you teacher for the copy of the correct answers.



Name: _____

Date: _____

Operation Sheet-1	Mise-en-place preparation
--------------------------	----------------------------------

Procedures

- Step 1. Wear PPE properly
- Step 2. Avoid cross contamination of others and environment
- Step 3. Perform hand washing
- Step 4 Measure/weigh accurately
- Step 5 Prepare Mise-en-place for mixing

Operation Sheet-2	Dough making process
--------------------------	-----------------------------

Procedures:

1. Mixing the flour and other ingredients with a yeast suspension.
2. Mixing the dough until it reaches optimum dough development
3. Round and place the dough into a fermentation cabinet at 30°C and 85%.relative humidity for 105 minutes.
4. Firstly, pass the punch dough through a sheeter, folded twice, and returned to the fermentation cabinet for 50 minutes
5. Secondly, pass the punch dough through a sheeter, folded twice, and returned to the fermentation cabinet for 25 minutes
6. Molding the dough into a cylinder shape and proofed in a pan for 62 minutes.



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 1:30hours. The project is expected from each student to do it.

Task-1 preparing Mise en place

Task- 2 Dough mixing



LG #70	LO #2- Operate and Monitor the dough mixing process
--------	---

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Starting and operating the process in the workplace policies and procedures
- Introducing the flavors to the mixing process.
- Monitoring the equipment to identify the variation in operating conditions
- Identifying, maintaining and reporting variations in equipment operation
- Monitoring the process of dough to meets specifications
- Identifying, rectifying and/or reporting the out-of-specification production/processing outcomes in the workplace.
- Taking corrective action in response to typical faults and inconsistencies
- Transferring the finished dough
- Maintaining the work area
- Conducting the work in workplace environmental guidelines
- Maintaining the workplace records

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:**

- Start and operate the process in the workplace policies and procedures
- Introducing the flavors to the mixing process.
- Monitor the equipment to identify the variation in operating conditions
- Identify, maintain and report variations in equipment operation
- Monitor the process of dough to meets specifications
- Identify, rectify and/or report the out-of-specification production/processing outcomes in the workplace.
- Take corrective action in response to typical faults and inconsistencies
- Transfer the finished dough
- Maintain the work area
- Conduct the work in workplace environmental guidelines
- Maintain the workplace records

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 test”

Information Sheet 1- Starting and operating the process in the workplace policies and procedures

1.1. Introduction to Starting and operating the process

Before beginning mixing/blending process make sure you are:

- ✓ wearing clean clothes
- ✓ your hair is tied back
- ✓ your hands are washed
- ✓ And you have no jewelry or nail polish on.
- ✓ Check all the equipment you will use is clean.





The first processing operation is:

- To measure and place all dry ingredients in a bowl ready to create dough.
- These should be measured accurately to achieve the correct ratio.

When mixing the wet ingredients together

- Use lukewarm water to dissolve the sugar and yeast.
- Leave in a warm place on the bench for 5 minutes; if it bubbles in the liquid, then the yeast is active and ready for use.

1.1.1. Starting and operating of dough mixing

The Twelve Steps of Bread Baking

Step 1: Scaling

All ingredients are measured. We would like to recommend two things for this step:

Measure all wet and dry ingredients by weight.

Use a formula that is expressed in "baker's math" or "baker's percentages."

(more about this in a future post)

This step concludes when all ingredients are accurately measured and lined up in order of use, as well as all tools and equipment are ready for the second step in the bread-making process.

Step 2: Mixing

Ingredients are combined into a smooth, uniform dough; the yeast and other ingredients are evenly distributed through the dough, the gluten is developed, and fermentation is initiated.



Step 3: Bulk or Primary Fermentation

The dough is allowed to ferment. Fermentation is the process by which the yeast acts on the sugar and starches and produces carbon dioxide and alcohol.

Step 4: Folding

The purpose of this step is to degas the dough, and we do that for four reasons: to expel some of the carbon dioxide, and avoid by that choking the yeast; to allow the gluten to relax a bit; equalize the temperature of the dough; and to redistribute the nutrients necessary for the yeast's continued growth.

Step 5: Dividing or Scaling

The dough is divided or scaled into the desired individual portions.

Step 6: Pre-shaping or Rounding

The portioned dough is loosely shaped into smooth, round balls. This organizes the dough into consistent pieces and makes the final shaping easier and more efficient. It also stretches the gluten on the outside of the dough and forms a skin that helps it retain the gases produced by the yeast.

Step 7: Resting

The benching or resting lasts approximately 20 to 30 minutes and relaxes the gluten, making the final shaping of the dough easier.

Step 8: Shaping and Panning

The dough is formed into its final shape and placed in the pan or mold that it will be baked in. Hearth breads that will be baked directly on the oven deck are placed in bannerols or between the folds of baker's linen.

Step 9: Proofing or Final Fermentation

The dough goes through one final fermentation. The dough should be placed in a temperature and humidity controlled environment to allow the bread to rise to the desired volume before baking. Optimum rise for this stage is 80 to 85 percent of the dough's overall volume.



Step 10: Baking

The dough is baked. The dough is often scored with a sharp knife prior to baking. This allows the bread to expand without bursting.

1.2. Standard operating procedures (SOPs)

Work is carried out according to company policies and procedures, regulatory and licensing requirements, legislative requirements, and industrial awards and agreements

Standard operating procedures describe important activities to ensure that anyone can perform those activities correctly and consistently. Standard operating procedures are essential for capturing institutional knowledge and for training new employees. In addition, they help ensure that work procedures are conducted to a consistent quality.



Self-check 1	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. Before beginning mixing/blending process what you make sure?
 - A. wearing clean clothes
 - B. your hair is tied back
 - C. your hands are washed
 - D. And you have no jewelry or nail polish on?
 - E. All

Test II: Short Answer Questions

1. Write all steps of operating the dough
2. What is the abbreviation of SOP

Score = _____
Rating: _____



Answer Sheet

Note: Satisfactory rating – 3 points Unsatisfactory - below 3 and 4 points

You can ask you teacher for the copy of the correct answers.

Name: _____

Date: _____

Information Sheet 2-	Introducing the flavors to the mixing process
-----------------------------	--

2.1. Introducing the flavors to the mixing process

Flavor is defined as: any natural or synthetic material, other than the basic raw ingredients, used in the production of a food item to enhance the final product

Food Flavours are classified into three major Categories:-

❖ **Natural Flavours**

- Herbs- Basil, mint
- Spices- Cardamon, clove, turmeric
- Aromatic Seeds- Anissed, Cumin
- Fruits- Orange, Lemon
- Vegetables- Pees, Onions, Garlic



❖ **Processed Flavour**

- Caramelized
- Roasted
- Fermented
- Toasted
- Baked

❖ **Added Flavour**

- Natural Extracted Flavour
- Essential Oil
- Essence
- Extracts
- Synthetic Flavour
- Fruit Flavour
- Savory Flavour
- Natural Flavours

They are usually extremely complex mixtures of many different substances. Sometimes the flavour of natural flavoring agent may depend upon a single substance. Eg:- Clove oil flavour is because of chemical eugenol. It contributes 85% of clove oil.

Food additives are substances added to food to preserve flavor or enhance its taste, appearance, or other qualities. Some additives have been used for centuries; for example, preserving food by pickling (with vinegar), salting, as with bacon, preserving sweets or using sulfur dioxide as with wines



❖ **Flavor enhancers**

This is a group of additives that has attracted adverse attention, in particular monosodium glutamate (MSG: E621), which is widely blamed for an intolerance reaction that became known as “Chinese Restaurant Syndrome”.

Flavor enhancers are substances that have no pronounced flavor or taste of their own but which bring out and improve the flavors in the foods to which they are added. Although salt has a distinctive taste of its own and is not classed as a food additive, it is in fact the most widely used flavor enhancer.

The next best known is glutamic acid and its salts, most commonly found in the form of monosodium glutamate, which has been used for several centuries in the Far East as a condiment in savory products.

Self-check 2	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: say true or false (4 point)

1. Caramelize is a categories of Processed food flavoring
2. The purpose of flavor is to enhance the final product

Test II: Short Answer Questions



1. What is the advantage of flavor?
2. Write types of food flavors.

Answer Sheet

Score = _____
Rating: _____

Note: Satisfactory rating – 3 points Unsatisfactory - below 3 and 4 points

You can ask you teacher for the copy of the correct answers.

Name: _____

Date: _____

Information Sheet- 3	Monitoring the equipment to identify the variation in operating conditions
-----------------------------	---

3.1. Monitoring equipment throughout the job

Workers have to monitor the equipment's operation correctly and report tools/equipment malfunctions or problems according to procedures to his immediate supervisors. A finished product may exhibit several quality characteristics. Quality control (QC) techniques apply by inspecting and measuring the product quality characteristics using inspection equipment and some procedures. By comparing to the standard, the product can be identified whether conforms to requirements or fails, consider as accepted or rejected as well.



Inspection provides useful information about the current demonstrated product quality. Then, any managerial decision made based on this information, which is concentrate more on the effort of product and process improvement program. Many procedures, especially for acceptance inspection, has been developed to conduct the inspection which technically effective and/or economically efficient. Consistent monitoring on quality will ensure that products meet the requirements defined by either the manufacturer's product design department or by customers

❖ **Recognizing deviations of variables**

Variables to be monitored include:

- Equipment performance (e.g. speed, output, variations)
- equipment component performance
- sequences and timing of operation
- materials changes (desired and not desired)

Deviations May include but not limited to:

- ✓ equipment production outputs
- ✓ equipment operating conditions
- ✓ Operating parameters like temperatures and pressures.so all these expected deviations has to be recognized monitored and reported.

❖ **Equipment inventories**

An accurate equipment inventory provides immunization programme managers and maintenance teams with important information about existing cold chain equipment appliances, including their functional status, age, location and net storage capacity.

This cold chain equipment inventory helps technicians plan repair activities and manage spare parts. Cold chain managers can use these data to plan cold chain equipment purchases. Equipment inventories also make contingency planning easier,



helping to identify alternative storage locations when needed due to equipment failure.

By combining maintenance and repair service data with an equipment inventory, maintenance technicians and cold chain managers can:

- anticipate when equipment is likely to need replacement;
- determine which facilities need or will need additional cold chain equipment; and
- Ascertain which equipment needs maintenance or repair, where it is located and what spare parts and tools are needed.

An equipment inventory is a listing of the key details of each cold chain equipment appliance. It also contains relevant facility details, including energy availability, catchment population and types of immunization services.

Using an equipment inventory as the foundation of a reporting system for equipment maintenance and repair systems also makes it easier to improve the accuracy of the equipment inventory data and to keep the data current.

Self-Check – 5	Written test
-----------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: choose the best Answer (3points)

1. Important information about existing equipment appliances, including



- a. Their functional status
 - b. Age and location
 - c. Net storage capacity.
 - d. All
2. Variables to be monitored include:
- a. Equipment performance (e.g. speed, output, variations)
 - b. equipment component performance
 - c. sequences and timing of operation
 - d. All

Test II: Give short Answer (3points)

- 1. What is the advantage of equipment monitoring?

Answer Sheet

Score = _____
Rating: _____

Note: Satisfactory rating – 3 points Unsatisfactory - below 3 and 4 points

Information Sheet- 4	Identifying, maintaining and reporting the Variation of equipment operation
-----------------------------	--

Name: _____ Date: _____

4.1. Identifying, maintaining and reporting the Variation of equipment operation

Workers have to monitor the equipment's operation correctly and report tools/equipment malfunctions or problems according to procedures to his immediate supervisors.

- A finished product may exhibit several quality characteristics.



- Quality control (QC) techniques apply by inspecting and measuring the product quality characteristics using inspection equipment and some procedures.
- By comparing to the standard, the product can be identified whether conforms to requirements or fails, consider as accepted or rejected as well.

Lack of maintenance: is the most common reason for plant failure. Mechanical equipment requires regular attention to ensure problem-free operation. Maintenance schedules must be strictly carried out and conduct routine maintenance.

The main problem areas are related to.

- ❖ poor design,
- ❖ Variations in raw flour quality,.
- ❖ lack of maintenance,
- ❖ inadequately trained operators,
- ❖ inadequate process monitoring,
- ❖ poor record-keeping and poor management

Preventative maintenance and operating procedures that is necessary to ensure

Self-Check – 6	Written test
-----------------------	---------------------

satisfactory operation.

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer

1. Which of the following is category of Maintenance activities?



- a. Preventive
 - b. Corrective
 - c. Inspection
 - d. All
2. _____ is the most common reason for plant failure
- a. Lack of maintenance
 - b. Preventive maintenance
 - c. Corrective maintenance
 - d. Inspection maintenance

Test II: Give short answer

1. How we report for the variation of equipment?

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Note: Satisfactory rating ≥3 points

Unsatisfactory - below 3 and 4 points

Information Sheet- 5	Monitoring the process of dough to meets specifications
-----------------------------	--

5.1. Monitoring the process of dough to meets specifications

A number of analytical methods have been investigated to monitor dough development based on physical or chemical description of dough properties. The most popular in-line process measurements, based on changes in dough physical properties, are that of mixing torque or power consumption of the mixer. Dough



development can also be measured using load cells that measures the force exerted by dough moving around the mixing bowl.

A simple and new method was developed for monitoring the dynamic density of dough during fermentation process. In this method digital imaging was applied to determine volume of dough sample in actual proofing conditions, i.e., temperature and relative humidity of the fermentation oven.

The method resulted that the volume increasing profile affected by temperature and relative humidity conditions of the fermentation oven. As when temperature and relative humidity was increased, volume expansion rate was higher. The data also demonstrated that dough density decrease with the investigated proofing temperatures of 25, 30 and 35°C more significantly ($p < 0.01$) than proofing relative humidity of 65%, 75% and 85% ($p < 0.05$). The new imaging method have the advantage of being low cost and measuring dough density in actual proofing conditions as used in bread making.

❖ **During monitoring dough to meets specifications**

- We determine dynamic density of dough via application of digital imaging method.
- Dough density profiles are affected by proofing time and oven conditions.
- Temperature has more significant effect on density changes as compared with related humidity.
- The developed method has the advantage of applying in actual proofing conditions
- Control over a mixing process can be demonstrated by a review of all relevant data at specified time increases. Relevant data includes sample results and trending of those results.



- Monitoring the mixing processes ensures the process is performed correctly and also provides an early warning if it is not performing as validated.
- Provides additional reassurance to the visual assessment and conductivity verification that is performed with each mixing.

Consistent with the lifecycle approach to validation (Design, Formal Validation Studies, and Ongoing Controls) as well as continuous improvement for manufacturing quality and efficiency

Monitoring mixing Cycles

- Temperature, flow, pressure, fluid level, drainage, mixing agent concentration, conductivity, and pH may play a role in monitoring the cleaning program and check amount of ingredients and additives added
- The nature of the mixing method will determine the critical parameters to be monitored during cleaning.
- Instrumentation for monitoring critical parameters should be accurate and subject to a routine calibration program.

Self-check 5	Written test
--------------	--------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say “True” or “False” for the following questions (3points)



1. Dough development can also be measured using load cells that measures the force exerted by dough moving around the mixing bowl

Test II: choose for the following Questions (3points)

1. To meets specifications of dough
 - a. We determine dynamic density of dough by digital imaging method.
 - b. Dough density profiles are affected by proofing time and oven conditions.
 - c. Temperature with related humidity.
 - d. All of the above

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Note: Satisfactory rating ≥ 3 points

Unsatisfactory - below 3 and 4 points

Information Sheet- 6	Identifying, rectifying and/or reporting the out-of specification production/processing outcomes in the workplace.
-----------------------------	---



6.1. Identifying Rectifying and/or Reporting Out-of-specification product/process outcomes

Identification of product/processes outcomes used to check either the products or processes are out of specification or not because every products or processes have their own specifications and have effects on the outcome after processing.

Main objective of Identifying and rectifying out-of-specification product/process outcomes in order to take corrective action in response to out-of-specification results

6.1.1. Specification of product/processes

The specifications of dough product have their own specification. Identifying and rectifying the processes and the products outcomes take place throughout the process and take actions when they occur, the processes or products will be out-of-specifications.

Removal of the dough from the mixer after completion of the mix should not, in itself, affect the mixing or the dough quality but if this is delayed for any reason there may be temperature difficulties due to the bowl jacket, as mentioned above, leading to non-uniform consistency in the dough mass. Also, if complete discharge is not effected, some dough will remain to be incorporated into the next mix, this may affect quality and will certainly frustrate techniques for process control. Many mixers discharge very badly and need much manual assistance to extract the dough. This is not only inefficient, but also potentially unhygienic.

If dough is too elastic, with very low extensibility and too much resistance to deformation, it will exhibit the following characteristics during processing:



- **Dough mixing:** possible under mixing (dough too stiff, tight and/or tough), insufficient water absorption.
- **Dough pump:** excessive friction against equipment surfaces causes excessive heat which increases dough temperature beyond allowable limits (promoting excessive gas production).
- **Dough divider:** Bucky or gassy dough could cause considerable scaling weight variations.
- **Dough sheeting and moulding:** poor machining as moulder and sheeter settings (pressures) must be increased (tightened) to form the final dough shape leading to cell structure damage, excessive 'spring-back' after application of stress, poor pan flow.



Self-Check –6	Written test
----------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: say “True” or “False” for the following questions

1. Main objective of identifying and rectifying out-of-specification product/process outcomes in order to take corrective action
2. Removal of the dough from the mixer after completion of the mix should not, in itself, affect the mixing or the dough quality

Test II Give short answer for the following

1. Explain if dough is too elastic, with very low extensibility and too much resistance to deformation

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Note: Satisfactory rating – ≥3 points Unsatisfactory - below 3 and 4 points



Information Sheet- 7	Transferring the finished dough
-----------------------------	--

7.1 Transferring the finished dough

Once dough is shaped, it needs to rise (be proofed) for a final time. It should be transferred to the pan it will be baked in or on (most often a loaf pan or baking sheet) first. As with previous rises, cover dough with lightly oiled plastic wrap and let it rise in a warm, moist environment. Alternatively, the final rise can take place in the refrigerator overnight, though be sure to bring the dough to room temperature before proceeding.

Let shaped dough rise until it has almost doubled in size and a finger gently pressed against the side creates an impression that slowly fills in. Note that this differs from the test for the initial proofing, when you are looking for the impression to hold. During the final rise, you don't want the dough to rise completely because it will continue to rise in the oven.

If the dough has over risen and keeps the impression, it will not continue to rise much if at all when placed in the oven. If it is under risen, it will rise too rapidly when placed in the oven and the crust will burst unevenly. Transferring dough into a blisteringly hot, preheated cooker can be tricky. To safely get scored dough into the pot I use a piece of parchment paper to drag it in. Dragging not only keeps your hands free of the pot but it also prevents dropping the dough.

Take your proofing basket and place a square piece of parchment over the top. Cut the parchment to fit the basket's opening with a small border overhang. Then, take a pizza peel (or an inverted baking sheet) and place it on top of the parchment. Quickly flip the entire stack over so the peel is now on the bottom with the basket and parchment paper on top.



Remove the preheated shallow side of the pot from the oven, and place it on a prepared heat proof rack. Then, score the dough and drag the parchment with dough on top into the hot pot. Don't worry if your parchment gets trapped and extends outside of the pot when the lid is placed on top. Bake as usual.

7.2. Transferring bread dough: Dutch oven

A Dutch oven is similar to a cloche bread baker but is often made of metal instead of clay and has a deep side and a shallow lid. Just like the combo cooker, a Dutch oven is a common baking vessel because it radiates heat nicely and seals when closed. It can be challenging to lower dough all the way to the bottom of these (with their deep sides) without dropping it from a high distance, potentially degassing your dough. Additionally, keeping your hands and arms clear of the hot sides makes lowering in the dough that much harder.

A solution to these issues is to once again use parchment paper. This time we'll cut the paper to create a "sling" that has two handles at the sides and a short top and bottom. The handles let us lower the dough into the pot slowly without having excessive parchment inside the pot, potentially causing bumps and wrinkles in the dough as it bakes. Place your Dutch oven in the oven and preheat according to the manufacturer's specification. Some cannot be preheated empty, so first check your manufacturer's recommendation.

When heated, place a piece of parchment paper on top of your proofing basket. Cut the paper into a rectangular shape that's a little wider than it is tall. At each corner, cut a curve to form a "handle" at the left and right side of the dough (see above). Then place the parchment on top of your proofing basket and place a pizza peel on top of the parchment and basket opening. Flip the entire stack over so the dough is now resting on the parchment and the peel.



Fig1. Transferring dough

Score the dough and then put on your oven-safe gloves. Remove the deep end of the preheated Dutch oven from your oven and place it on a heatproof rack on your counter. Grab the parchment handles and lift your dough up and into the hot pot. Place the pot back into the oven and cover with the lid to bake.



Fig.2. Transferring dough

7.2.1. Transferring bread dough: baking stone

Steaming a home oven without a pot has been discussed here before, but it's worth further exploring a way to easily get one or two loaves into and out of the oven.

Cut a piece of parchment paper that's either wide enough to fit a single loaf, or if baking two loaves at a time, as wide as your baking stone. If baking two, I sometimes find it helpful to then cut the wide paper rectangle in half so I can adjust the loaves in



the oven by dragging the papers closer together or farther away from each other. We've all made the mistake of loading two loaves too close together and they end up touching in the oven!



Fig.3 Transferring dough

Place the parchment paper on a pizza peel (or again, an inverted baking sheet) and quickly turn your dough. Usually oval baskets are not as deep as they are wide, so it's hard to place the peel on top of the basket without smashing the dough. However, if you're baking a round loaf you might be able to place the peel directly over the round basket and flip as before.

Next, open your preheated oven and drag (or scoot) the parchment and dough onto your baking stone.

Self-check 7	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.



Test I: choose best answers for the following questions (3points)

1. Once dough is shaped, it needs to rise (be proofed) for a final time then it should be transferred to_____.
 - A. Baking pan
 - B. Prover
 - C. kneading machine
 - D. none
2. which of the following is like combo cooker
 - A. Dutch oven
 - B. Prover
 - C. Mixer
 - D. Normal oven

Test II: Short Answer Questions (3points)

1. Explain the purpose of transferring dough for the next step.

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Note: Satisfactory rating – ≥3 points Unsatisfactory - below 3 and 4 points

Information Sheet- 8 housekeeping	Maintaining the work area according to Standards
--	---



8.1. Maintaining the work area according to housekeeping standards

Industrial good housekeeping is a term which is often not fully understood. However most be good housekeeping is just good common sense. Everyone is responsible for safety and means that all management and every employee should have an understanding of good housekeeping practice, and how it can help to prevent a large number of accidents at work.

Good housekeeping involves the maintenance of good lighting and heating, power supply lines, tools, machinery and the facilities for the efficient storage of materials and equipment. Removing of any loses items, particularly when working at height or on grating should be a permanent concern. It also means maintaining the necessary standards of domestic cleanliness and tidiness to provide safe, healthy and pleasant places in which to work and live.

Among the from benefits to be derived good housekeeping are:

- Increased efficiency.
- The reduction of accident hazards.
- The reduction of fire hazards.
- Improved morale.
- Compliance with the law.
- Creating a favorable impression to people outside the Company.

Workshop should be kept neat and tidy. Good housekeeping can significantly reduce the risk of an accident and injury, failure to maintain a clean and tidy Workshop can result in accident and injury. Work areas and equipment are to be thoroughly cleaned after use.



Self-check 8	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

1. What is the of benefits good housekeeping?
 - A. Increased efficiency.
 - B. The reduction of accident hazards.
 - C. The reduction of fire hazards.
 - D. All of the above

2. Good housekeeping involves the maintenance of:
 - A. good lighting
 - B. heating and power supply lines,
 - C. tools and machinery
 - D. All of the above

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Note: Satisfactory rating – ≥3 points Unsatisfactory - below 3 and 4 points

Information Sheet- 9: Conducting the work in accordance with guidelines



9.1. Conducting the work in accordance with guidelines

This describes the interpreting of schedules and plans, as well as a clear understanding of procedures to be undertaken and the targets to meet. When the requirements of the standards' met, employees understand the role their work

- plays, in maintaining quality output
- Motivated work force supports management in detecting, solving, correcting and preventing problems in the production area.
- Identification of the required resource
- Doing any work related with modern dairy production system we have to allocate the necessary resources which, proper and suitable to undertake the general work activities.

It is usually done within routines methods and procedures where some discretion and judgment is required in the selection of equipment and materials, organization of work, services, and actions to achieve outcomes within time and budgetary constraints should be properly allocated.

The resource, which allocated used to achieve the work. Some of the resources are, materials, tools and equipment, financials, labours, machinery, personal protective equipment, etc, have to be allocated so as to run the work properly

A. Develop Health and Safety Program

A good, sound health and safety program is an effective way to manage risks and productivity in your operation.

- Accidents are not only costly in human terms, but they can disrupt the flow of work and halt production.
- There are always hidden costs.



- The actual injury to an employee is only the “tip of the iceberg”. A good health and safety program should include the following components:

B. Written Health and Safety Policy

This simple statement shows your commitment to health and safety for all employees. It only needs to be a few sentences or a short paragraph.

C. Written Safety Rules

A set of basic rules for your operation as well as specialized safety rules for specific tasks, equipment or processes need to be developed. The list should not be long and unmanageable. Rules should be simple and easy to understand and may need to translate into a worker’s language. The rules should be reviewed with all new employees, as well as posted for all employees to see

D. Safety Director/coordinator

You need to appoint someone to look after safety as a part of their job. You may also want to have a safety committee or safety representatives from both workers and management. This will keep safety out front all the time.

E. Employee Training

- Employees should receive periodic training as necessary to review safety procedures.
- New employees should receive safety training both before and on the job.
- Close -calls or accidents should trigger an immediate review of procedures and safety with employees.

F. Workplace Inspection

- System of workplace inspection should be set up to review hazards and practices in the workplace.
- Any time that there is a new process introduced or new machinery installed, an inspection should take place



- Employees should be encouraged to report hazards, close calls or anything out of the ordinary that could lead to

G. Injury Emergency Plan

- There should be an emergency plan for any accident, fire, disaster or other unexpected event that may occur
- Employees should know what their responsibilities are during an emergency.
- Plan could include what to do during fires, power failures etc.

✓ Documentation is important

- To keep records of training
- Safety meetings/concerns
- Corrective actions for accident investigations etc. as “Due Diligence”.

H. Managing Waste material from dairy products processing like

- Effluent from
 - ✓ Tanker washing,
 - ✓ Cleaning milk splits
 - ✓ Cheese whey
- Air emission gases
 - ✓ Milk powder dust
 - ✓ Refrigerant gases odor
- Solid Waste
 - ✓ Damaged product
 - ✓ Out of date products



Self-Check 9	Written Test
---------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Test –I choose the best answer (each 2 point)

i. _____ is the interpreting of schedules and plans, as well as a clear understanding of procedures to be undertaken and to meet in working place.

- A. Develop Health and Safety Program
- B Clarification of work requirement
- C. Written Health and Safety Policy
- D. Written Safety Rules

Part II Fill the black space

1. Write the purpose of documenting work place Injury emergency occurred (3%)

_____ , _____
 _____ , _____

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Note: Satisfactory rating ≥5 points

Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers.



10.1. Maintaining Workplace records

Workplace records are an important part of any work environment and should be accurately, reliable, easy to follow, consistent as the basis used and be very simply.maintained within the required timeframes.

Records must be kept to allow proper equipment management and control. Performance records are required for trouble shooting, to identify changes in operating conditions, to identify reasons for process failure or dough quality reduction, for process optimization, to record changes in influent quality and process conditions, etc.

All Records should be:

- legible and clear;
- Dated;
- readily identifiable and retrievable;
- carry authorization status;
- retained for a designated period;
- Protected from damage and deterioration while storage.
- All calculations should be duly recorded

4.1.1. Types of workplace records

There are different types of records according to workplace guidelines and requirements. Those are which listed below:



A. Staff records

- These are records relating to any and all aspects of staffing the premises. May be divided into overall records and individual staff records. Overall records are those records kept that relate to staff as a whole

❖ Overall records

- Staffing rosters
- Training details by operational area
- Annual leave planning chart
- Salary and overtime payments
- Injury records.

❖ Individual staff records

- Leave records
- Record of uniform orders
- Training schedule
- Direct salary deduction details
- Injury claims.

4.1.1.1. Types of records

Staff may be given required to complete records such as:

- Time sheets
- Requisitions
- Internal transfers
- Requests for maintenance
- Daily takings sheets.

❖ The importance of records

- For continuous monitoring of quality system



- For specimen tracking throughout process
- To identify failures in equipment
- To revisit information; reference
- For use as a management tool

Workplace information

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



Self-Check 1	Written Test
--------------	--------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test - I: Say true/false

1. Workplace records are an important part of any work environment (3point)
2. There are not different types of records according to workplace guidelines and requirements. (3points)

Test II: Choose the best answer

1. Why are records essential? (3points)
 - A. For continuous monitoring of quality system B. To identify failures in equipment
 - C. To revisits information; reference D. All
2. The importance of records (3points)
 - A. For continuous monitoring of quality system
 - B. For specimen tracking throughout process
 - C. To identify failures in equipment
 - D. All

Test III: Short answer

1. Write five Types of records (4points)
-

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score = _____
Rating: _____



Note: Satisfactory rating ≥ 7 points

Unsatisfactory - below 7points

Operation Sheet-1

Starting and operating dough process

Name: _____

Date: _____

Procedure:

Step 1: Scaling

Step 2: Mixing

Step 3: Bulk or Primary Fermentation

Step 4: Folding

Step 5: Dividing or Scaling

Step 6: Pre-shaping or Rounding

Step 7: Resting

Step 8: Shaping and Panning

Step 9: Proofing or Final Fermentation



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 **1:30hours**. The project is expected from each student to do it.

Task-1 Starting and operating dough process



Instruction sheet	
--------------------------	--

LG #71	LO #3- Shutdown the dough process
---------------	--

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying the appropriate shutdown procedure
- shutting down the process according to workplace procedures
- Identifying and reporting maintenance requirements

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:

- Identify the appropriate shutdown procedure
- shut down the process according to workplace procedures
- Identify and report maintenance requirements
-

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 test"



Information Sheet 1-	Identifying the appropriate shutdown procedure
-----------------------------	---

1.1. Identifying the appropriate shutdown procedure

Shut down/isolation means and includes isolation of mechanical, electrical drives, pipework (pressure) rotating equipment etc. utilizing electrical lock-off isolators, mechanical and power driven valves etc. in accordance with standard operating instructions.

Pull plug or throw switch to off position before cleaning or adjusting any machine. Keep fingers, hands, spoons, etc., away from moving parts. Wait until machine stops before moving food.

❖ **Relevant regulations:**

- Under taking Shut-down sequence safely and to standard operating procedures.
- Depressurizing the machine/equipment to standard operating procedures.
- verify Safe shut-down of machine/equipment is
- linstall safety/security lock-off devices and signage to standard operating procedures.
- Do not start a mixer until the bowl in place securely fastening and the attachments



- When using a mixer, turn off motor before you scrape down the sides of the bowl.
- Machine/equipment is clean and safe stat
- When working with tools at height makes sure they cannot fall
- switch off when disconnected from their power do not leave power tools
- Ensure that cables, power lines, pipes and hoses
- Check insulation, switches and fuse boxes for possible hazards. Ensure warning signs are clear and easily seen.
- Ensure that correct type of firefighting equipment
- Remove empty cartons, wrappings and other flammable waste as soon as possible
- Never use any machine you have not been train to use.
- Check all switches to see that they are off before plugging into the outlet.
- First pull the plug.
- Turn the gauge to zero in order to cover the edge of the blade
- Clean the blade from the center out.
- Clean the inside edge of the blade with a stick that has a cloth
- Never start a machine until you are sure all parts are in their proper places. If it is a machine that operates with gears, check the gear position.
- You must be aware of the lock-out procedures that are to be follow before repairing or cleaning any machine. Lock-out procedures must be clearly posted by management near each machine.
- Many industries have emergency shutdown systems or “panic buttons.” These are installed so that only one switch has to be thrown to kill the power to a large amount of equipment. These systems are to be used when a person is being electrocuted or is caught in a piece of machinery. Under these circumstances, you do not have time to hunt for and throw the correct switch. Fast action is necessary. Hit the panic button.



- When you enter an industry for the first time, locate and learn how to use the emergency shutdown.



Self-check 1	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1. Relevant regulations for shut down dough mixing equipment
 - A. Shut-down sequence is undertaken safely and to standard operating procedures.
 - B. Machine/equipment is to standard operating procedures.
 - C. Safe shut-down of machine/equipment is verified.
 - D. Safety/security lock-off devices and signage are installed to standard operating procedures.
 - E. All

Test II: say “True” or “False” for the following questions

1. Before shutdown remove empty cartons, wrappings and other flammable waste as soon as possible.

Score = _____
Rating: _____

Answer Sheet

Name: _____ Date: _____

Note: Satisfactory rating ≥5 points Unsatisfactory - below -5 points



Information Sheet 2-	shutting down the process according to workplace procedures
----------------------	--

2.1 Shutting down process:

An occasion when a large piece of equipment stops operating, usually for a temporary period or the act of closing a factory or business of stopping a machine.

Reading, interpreting and following information on written job instructions, specifications and other applicable reference documents

- checking and clarifying task-related information
- Entering information onto preforms and standard workplace forms.
- Shutting down machine/equipment.
- Purging/de-energizing equipment.
- Installing safety/security lock-off devices and signage

2.1.1 Dough Mixer Lock-Out Procedure

- ✓ Shut off mixer at stop/start switch.
- ✓ Shut off at disconnect behind mixer.
- ✓ Apply lock to disconnect. Put key in pocket. Do not leave key in lock!
- ✓ Attempt to start mixer, reset or return switch to “off” position.
- ✓ Complete work on mixer.
- ✓ Ensure bowl and mixer are clear of loose pieces, tools, etc
- ✓ Remove lock.
- ✓ Restart mixer and run up to operating speed.



Self-check 2	Written test
---------------------	---------------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (10 point)

1. Shutting down procedures
 - A. checking and clarifying task-related information
 - B. Entering information onto preforms and standard workplace forms.
 - C. Shutting down machine/equipment.
 - D. Purging/de-energizing equipment
 - E. All

2. When you shut down the machine?
 - a. After you finished the task
 - b. When same problems has happened
 - c. During the during cleaning a machine
 - d. All

Test II: Choose the best answer (10 point)

1. Write the shutting of machine procedures
2. What you do before you shut down?

Score = _____
Rating: _____

Answer Sheet

Name: _____ Date: _____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below -5 points



Information Sheet- 3	Identifying and reporting maintenance requirements
-----------------------------	---

3.1. Identifying and reporting maintenance requirements

Maintenance is the upkeep of equipment and machinery in proper working condition at all times. Maintenance plan in dough product processing includes:

- maintenance activities and schedules
- maintenance costs and budget details
- Staff resource and supply requirements
- staff roles and responsibilities
- contingency plan for staff and supply problems
- reporting requirements
- hazard and risk control measures
- OHS procedures, personal protective clothing and equipment requirements
- environmental impact control measures

❖ **Enterprise requirements include:**

- Standard Operating Procedures (SOP),
- Industry standards and production schedules,
- Material Safety Data Sheets (MSDS)
- Legislative and licensing requirements
- Work notes, product labels and manufacturers specifications,
- Operator's manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guideline, and OHS procedures

❖ **Reporting for maintenance**



Report to your immediate supervisor any tool or piece of equipment that is broken or does not function properly or unsafe equipment to a responsible individual to prevent

Self-check 3	Written test
---------------------	---------------------

serious injury

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test -1 Choose the best answer (6 point)

1. What is the primary purpose of a preventive maintenance program?
 - a. Increase the use of backup equipment
 - b. Correct equipment breakdowns
 - c. Eliminate inventory of spare parts
 - d. All

2. What are enterprises requirements?
 - a. Work notes
 - b. product labels and manufacturers specifications
 - c. policies and procedures
 - d. all
 - e. none of the above

Test –II Give short answer for the following questions

1. For whom you report if there is machine or equipment broken?
2. Why you report?

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____



Note: Satisfactory rating – ≥ 5 points

Unsatisfactory - below -5 points

Operation sheet 1	Shut down mixer
--------------------------	------------------------

Procedures:

1. Shut off mixer at stop/start switch
2. Shut off at disconnect behind mixer
3. Apply lock to disconnect. Put key in pocket. Do not leave key in lock!
4. Attempt to start mixer, reset or return switch to “off” position.
5. Complete work on mixer.
6. Ensure bowl and mixer are clear of loose pieces, tools, etc
7. Remove lock.
8. Restart mixer and run up to operating speed.



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 **1hours**. The project is expected from each student to do it.

Task-1 shut down mixer process



Reference

1. MacRitchie, F. (2010). "Structure and properties of dough." Concepts in Cereal Chemistry, CRC Press Taylor & Francis Group, LLC, , pp. 29–35.
2. Hamer, R.J., MacRitchie, Fand Weegels, P.L. (2009). "Structure and Functional Properties of Gluten." Wheat Chemistry and Technology, 4th edition, AACC International, Inc., pp. 153–161.
3. APV Corporation Ltd (1992). *Dough mixing*, UK Patent GB 2 264 623A, HMSO, London, UK. [Google Scholar](#)
4. Cauvain, S.P. (1994). New mixer for variety bread production. *European Food and Drink Review*, Autumn, 51–3.
5. Paquet-Durand et al., Journal of Food Engineering, 111, 2012, 425-431



AKNOWLEDGEMENT

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 Learning Materials.

We would like also to express our appreciation to the TVET instructors and respective Regional TVET Bureau, TVET College/ Institutes, UNESCO Project (best education for African rise (BEAR)) and Federal Technical and Vocational Education and Training Agency (FTVET) who made the development of this Teaching, Training Learning Materials with required standards and quality possible.

This Teaching, Training Learning Materials was developed on September 2020 at Bishoftu, Federal management institute ETHIOPIA





The trainers who developed the Teaching, Training Learning Materials

No	Name	Qualification	Educational background	Region	E-mail
1	Teshale Besufikad	B	Food science and post-Harvest Technology	Hawasa	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	Leader ship management	Amhara	tayezelalem22@gmail.com