



Cereal processing

Level-II

**Based on October 2019, Occupational standards
Version 2**

**Module Title: Operating a Pastry Production
Process**

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LG 48

**LO 1- Prepare the pastry
manufacturing equipment and
process for operation**

Instruction sheet

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

- Confirming raw materials and ingredients
- Weighing/loading materials and ingredients
- Identifying cleaning and maintenance requirements and status
- Workplace policies and procedures
- Confirming services an ready for operation
- Checking and adjusting equipment performance
- Set the process with production requirement

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:

- Confirm raw materials and ingredients
- Weigh/load materials and ingredients
- Identify cleaning and maintenance requirements and status
- Workplace policies and procedures
- Confirm services an ready for operation
- Check and adjust equipment performance
- Set the process with production requirement

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- Confirming raw materials and ingredients

1.1 Introduction

The term raw materials means products extracted from nature in their raw state and that often require transformation before being used. Agricultural products such as wheat, rice and corn are examples of raw materials. Raw materials can be used to obtain an end product. A pastry, for example, is an end product, ready for consumption, comprising several raw materials.

1.2 Inspection of raw material

No raw material or ingredient or any other material used in processing products shall be accepted by a Food Business Operator, if it is known to contain chemical, physical or microbiological contaminants which would not be reduced to an acceptable level by normal sorting &/or processing. All incoming material should be examined at point of receiving for physical integrity & product information mentioned on the label. Receiving temperature of potentially hazardous food must be 5°C or below; or 60°C or above. Receiving temperature of frozen food shall be -18°C or below. Records of the receiving temperatures of potentially hazardous & frozen foods must be maintained. Where necessary, laboratory tests should be made to establish fitness for use. Only sound, suitable raw materials or ingredients should be used. Material should be inspected, tested or covered by certificate of association to verify conformity with specified requirements prior to the acceptance or use. The method of verification should be documented.

Packaged raw material must be checked for expiry date/best before/use by date, packaging integrity & storage conditions before accepting them & stored accordingly. Records of raw material or ingredient or any other material used in processing as well as their source of procurement shall be maintained for inspection & traceability. Access points to bulk material receiving lines should be identified, capped & locked. Discharge into such systems should take place only after approval & verification of the material to be received. Ingredients containing allergens should be clearly identified &

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stored to prevent cross contamination with ingredients & products not containing allergens & with other material products.

1.3 Ingredients of pastery products

1.3.1 Flour

- Significant factor which determines final bread quality
- It gives bread its structure which is created by gluten
- Plays the major role in the processing of the product
- The product itself is more or less a result of the flour

The gelatinised starch and coagulated protein provide:



- Body (crumb)
- Structural support
- Protein through coagulation
- Starch through gelatinisation.



1.3.2 Water

Water is the most common liquid used in commercial baking. comprises approximately 33 - 40% of the dough by weight it is responsible for:

- hydration of the dry ingredients in the bread formula
- forming the gluten complex (visco-elastic substance) during mixing

Water also serves as:

- ✓ a dispersing medium for other ingredients
- ✓ a solvent for solutes like salt and sugar

1.3.3 Fats

The fat in a cake batter tenderises the gluten and starch particles, making the crumb moist and tender. It also traps air during the beating process, which aids in the aerating of the batter and the cake

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- Softens texture of cake
- Shortens the crumb (gluten)
- Improves eating quality
- Improves keeping quality
- Gives improved crust colour
- Assists primary aeration, that is, in the creaming stages for batter mixes sugarbatter or flour



Figure 1:Table butter



1.3.4 Sugar/Sucrose

The basic source of energy which yeasts convert into CO₂ to leaven the dough

- The most important food requirement for yeast in a fermenting dough
- Flour is the principal source
- Sucrose is usually incorporated in yeast-leavened breads
- increases the rate of initial fermentation
- Sugar also makes breads tender too.
- It does this by preventing the gluten from becoming too elastic.
- The bread is chewy and tough when the gluten becomes too elastic.
- A variety of sugars
- Can either be derived from wheat starch or added by the baker



- **Advantages claimed are:**

- ✓ Better fermentation
- ✓ Improved crumb softness & moistness
- ✓ Improved crust color

1.3.5 Eggs

Egg also provides:

- ✓ Structure
- ✓ Nutritional value
- ✓ Improved eating quality
- ✓ Improved keeping quality
- ✓ Colour

1.3.6 Glycerine

- ✓ Increased shelf life
- ✓ Better foam stability
- ✓ Finer texture
- ✓ Moister crumb
- ✓ Increases volume

Glycerine improves the shelf life of sponges, cakes and other bakery items. It attracts moisture and therefore keeps bakery products fresher for a longer period of time. Swiss rolls made with glycerine are less likely to crack. Usage ratio: 2% of total cake batter 10 gm – 30 gm of glycerine to every 500 gm of sugar 70 gm of glycerine to every 5 kg dried fruit prevents soaked fruit fermenting.

1.3.7 Leavening agents

- Produce gas bubbles that cause bread to expand and rise.
- As the bread rises, it becomes light and porous
- The common agent for the production of gas is a selected strain of the yeast, *saccharomyces cerevisiae*
- During dough fermentation, yeast has three major functions:



- CO2 gas production and leavening dough maturation
- flavor development- b/c of metabolic products

1.3.8 Salt

- Salt has three major functions in yeast-leavened breads:
- Flavor generation (principal)
- Inhibition or control of yeast activity
- Strengthening of gluten
- Additional effect of salt is its inhibitory action on spoilage microorganisms
- Bread made without salt is insipid and flavorless
- Almost inedible to people used to eating bread made with normal salt levels.

However, salt has a significant effect on fermentation:

- ✓ The higher the salt level, the lower the rate of fermentation and vice versa
- ✓ Dough's made without salt tend to be softer and more sticky than normal dough's
- ✓ Weak gluten
- ✓ Today, salt levels appear to be in the range of 1.8 to 2.1% on flour weight basis.

1.3.9 Milk products

can improve both

- nutritional quality
- eating quality

commercially incorporated milk products:

- Liquid whole milk
- Dried whole milk
- Liquid skimmed milk



Self-check 1	Written test
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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. Why need to check raw materials at receiving area?
 - a. To assure quality
 - b. To assess critical hazard
 - c. To reduce the possible risks
 - d. all

2. Among the following which one is an ingredient of pastry?
 - a. butter
 - b. yeast
 - c. flour
 - d. leavening agent
 - e. all

Test II: Short Answer Questions (3 points each)

1. List the common ingredients of pastry?
2. Describe the function pastry ingredients?
3. Type the quality parameters of pastry ingredients?

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

Note: Satisfactory rating 12 points	Unsatisfactory below 12 points
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Information Sheet 2- Weighing/loading materials and ingredients

2.1. Weighing/loading materials and ingredients

Weighing – all items must be weighed correctly as required in the recipe, as inaccuracies will affect the quality of the final dish

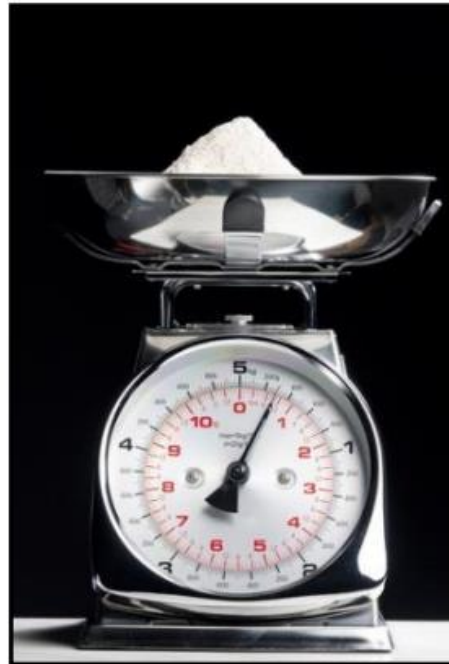


Figure2: Weighing

Measuring – all liquids must be measured correctly and as the recipe requires, or the flavour and textures of the final dish will be affected



Figure3: Measuring device

Rolling – using a rolling pin, pastry is rolled out to the required size and thickness. It should be evenly rolled so it is the same thickness. Pastry needs to be handled with care so that it is not overworked as this affects the quality of the pastry



Figure4: Cutting and rolling

Mixing – used to combine and evenly distribute ingredients though a mixture. This forms an aeration



Figure5: Mixing

Creaming – combining sugar with a solid fat such as butter and beating until a pale creamy yellow colour. This adds air to the mixture to create rise when cooking



Figure6: Creaming

Beating – mixing ingredients with a wooden spoon, electric mixer or food processor to incorporate air into the mixture to make it light and fluffy, e.g. when making sponge fingers the egg yolks are beaten with two-thirds of the caster sugar to a soft ribbon consistency



Figure7: Beating

Whisking – used to trap air and increase volume. Commonly used when making French meringues as the egg whites are whisked and then sugar added and whisked until the mixture forms peaks and whisking cream to thicken it. A metal or electric whisk can be used



Figure 8: Whisking

Folding – use to add a beaten ingredient into a denser ingredient e.g. whisked egg whites into melted, cooled chocolate. As much air as possible needs to be retained in the mixture. The technique used is to take a metal spoon or flat specular and move it gently in a figure of eight movement through the mixture while turning the bowl



Figure 9: Folding

Rubbing in – the process of making butter and sugar into a crumb like consistency. This method prevents the gluten strands from becoming activated, which would result in a tough paste with a hard crust



Figure 10: Rubbing

Greasing moulds/tins – brush the mould with melted butter and can be used with silicone paper so items can be easily removed from the mould, e.g. French cheese and ham savoury flan



Figure 11: Greasing

Fermenting or levain – a mixture of ingredients, usually flour, water and yeast, which is put into a plastic container with a lid and left at room temperature for a minimum 6 hours. This is then added to bread dough to increase the flavour and lighten the finished bread texture.

- Bulk fermentation time (BFT) – this term is used to explain the amount of time required for the first prove of the dough to create the fermentation of the dough
- Resting the dough – the dough is left to sit covered to allow the gluten to relax which makes the dough easier to shape
- Kneading or working the dough – once the ingredients have been mixed to make the dough it is kneaded or worked to stretch and develop the gluten structure. When kneading by hand the dough is pushed and pulled so as to stretch the dough Proving



Figure 12: Dough kneading

Proving – the final proving is done after the dough has been shaped. It is left to increase in size and the proving improves the texture of the finished baked product

- Knocking back – once the dough has finished being proved for the first time it is then kneaded to knock the air bubbles out of the mixture to create an even texture in the final product
- Scaling – used to ensure that portion size is controlled by weighing the pieces of dough after it has been divided into smaller pieces using a dough divider



Figure 13: Knocking dough

- Shaping – to create the final shape of the dough product



Figure 14: Shapping the dough

2.2. Ingredient transfer

The transfer of major ingredients into and within a bakery plant is generally achieved via various types of conveying systems. Pressure Differential (PD) trucks and railcars use positive pressure to unload material, whereas other types of delivery to the batching process can often be achieved by either positive pressure or vacuum pneumatic conveying. The mode of transfer of ingredients is dependent upon a wide variety of process parameters, including material characteristics, distance to be transferred, required rate of transfer, and the type of source and destination containers and/ or process.

2.3. Batch weighing principles

After transfer from the material source, the ingredients are usually delivered to the batching station. This station may consist of volumetric metering devices, such as screw feeders or valves, which deliver the product to a hopper mounted on load cells. This method is called Gain-in-Weight (GIW) batching. Alternatively, the station may consist of gravimetric feeding devices, such as screw or vibratory feeders, mounted on load cells or scales, which deliver the product to the process by means of Loss-in-Weight (LIW) batching. As outlined below, in some cases where small amounts of micro



ingredients are required for an overall large batch, both methods are employed: LIW feeders for the micros and minors, and GIW batchers for the major ingredients.

2.4. Factors affecting accuracy

The principal dynamic influence factors are listed below (where particular applications have specific factors these will be listed in the appropriate sub-section):

2.5.1 High feed rate

The force set up by momentum changes due to the impact of the material flow can cause the trip point to be triggered prematurely. The errors can be reduced by reducing the feed rate, often achieved by retaining high feed rate coarse segments of the weighing cycle to minimise the cycle time, but introducing one or more fine feed segments with lower feed rates. Additionally the physical

2.5.2 Guide to dynamic weighing for industry

layout of the inlet ducts may be engineered to minimise the effect impact forces on the weight measurement. In some applications the presence of a high initial impact force may be overcome by incorporating a time delay into the control cycle to allow the system to ignore it until it dies away.

2.5.3 Delayed cut-off response

This effect is characterised by a compensation weight that decreases the feeder cut-off point to allow for the material that is still falling.

2.5.4 Inconsistent material flow

This occurs when the material stream flow rate varies such as when the rate pulses because of the design of the screw feeder, if there is partial starvation due to material bridging in the hopper or other material handling issues. Compensation will not easily correct this problem although there is the possibility to add instantaneous feed rate corrections into the in-flight compensation. The solution usually lies in properly

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designing the hoppers, ensuring a constant minimum head of material and if necessary material flow enhancers.

2.5.5 Miscellaneous factors

There are a number of variables in an automatic weighing operation, which can vary from one weighing cycle to the next - these include: variation in the speed of operation of the cut off mechanisms; material density variation; and vibrations transmitted through the support structure or originating from the vibro-feeders or other motorised equipment mounted on the weighed structure itself.

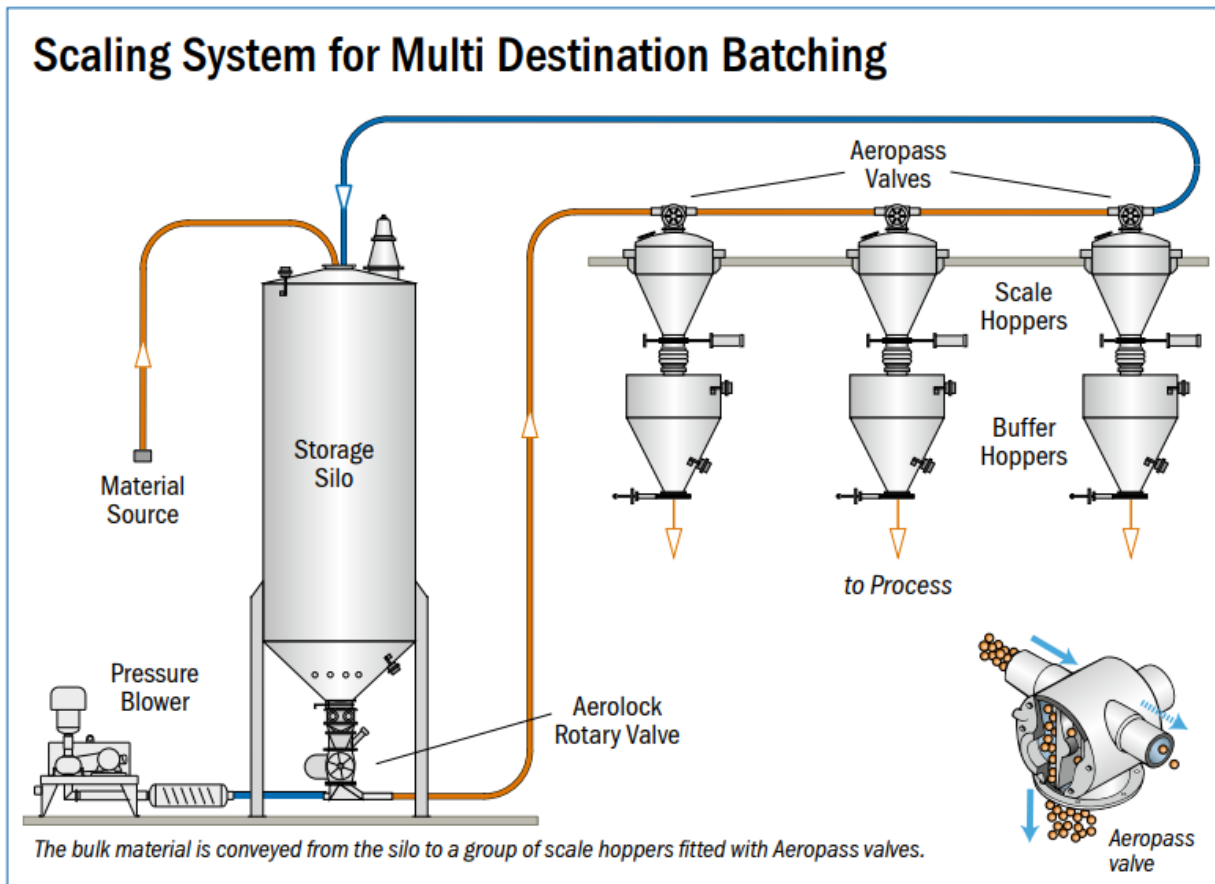


Figure 15: Pneumatic Conveying and High Accuracy Batch Weighing for the Bakery Industry



Self-check 2	Written test
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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 (2 point)

1. Which one is not the use loading and weighing?
 - a. To putt right ingridents of mixes
 - b. Uniformly disperse components
 - c. Transfer ingridents to batch operation
 - d. Get quality out put
 - e. None

Test II: Short Answer Questions (3 points each)

1. Define loading and weighing of ingridents?
2. List the types loading and weighing equipments?
3. Describe the different transferring equipments?

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

Note: Satisfactory rating 11 points	Unsatisfactory below 11 points
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Information Sheet 3- Identifying cleaning and maintenance requirements and status

3.1 Cleaning requirements

There shall be adequate, preferably separate facilities provided for cleaning food, utensils & equipment to prevent contamination. These facilities shall be –

- Constructed of corrosion resistant material
- Easy to clean
- Adequate supply of hot & cold potable water

The sinks designated for cleaning food material should not be used for hand washing or any other personal activity. Food premises & equipment should be of hygienic design and shall be maintained in an appropriate state of repair (such as no flaking paint or plaster, no broken tiles) & cleanliness.

Ensure all equipment, utensils and food contact surfaces should be cleaned and sanitized thoroughly before start of operation. For eg. Proper sanitation of fermentation chamber or premise will help to eliminate microbes in the product. Cleaning and sanitizing equipment should be designed for its intended use and should be properly maintained.

Cleaning program shall remove food residues and dirt which are source of contamination. Cleaning can be carried out by the separate or the combined use of physical methods, such as heat, scrubbing, turbulent flow, vacuum cleaning or other methods that avoid the use of water, and chemical methods using detergents, alkalis or acids. Cleaning and sanitizing procedures should be written for both cleaned-out-of-place (C.O.P.) equipment and cleaned- in-place (C.I.P.) equipment. CIP systems shall be separated from active product lines. Parameters for CIP systems shall be defined and monitored (including type, concentration, contact time and temperature of any chemicals used).

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A cleaning and disinfection program shall be drawn up, observed and records of the same shall be maintained. The programme should ensure that all parts of the establishment are appropriately clean, and should include the cleaning of cleaning equipment. The operator shall implement a written cleaning program which specifies

- Areas, items of equipment and utensil to be cleaned
- The person or people responsible for particular tasks
- The frequency of cleaning
- The procedures for cleaning and sanitizing, including disassembly and assembly instructions
- Monitoring arrangements for checking effectiveness of cleaning (eg. Through audits or microbiological sampling and testing of the environment and food contact surfaces)

Cleaning procedures should involve, where appropriate:

- Removing gross debris from surfaces;
- Applying a detergent solution to loosen soil and bacterial film and hold them in solution or suspension;
- Rinsing with water which complies with section 4, to remove loosened soil and residues of detergent;
- Dry cleaning or other appropriate methods for removing and collecting residues and debris. For eg. Dusters/cleaning clothes should not have loose threads & preferably be double
- stitched from all sides. Also, to remove crumbs and burnt product blow drying is a suitable process; where necessary, disinfection with subsequent rinsing unless the manufacturers
- Instructions indicate on scientific basis that rinsing is not required.

Cleaning chemicals shall be food grade, handled and used carefully, in accordance with manufacturer's instructions. It should be ensured that cleaning & sanitizing chemicals do not contaminate food or packaging material during or after cleaning and sanitizing. Ensure clear identification of containers containing cleaning chemicals.



Special sanitation and housekeeping procedures required during manufacturing, storage, distribution and handling should be specified within the document (for example, removal of product residues during breaks, glass breakage procedures).

3.2 Maintenance requirements

Maintenance is a general upkeep and repair of equipment, buildings and grounds, heating and air-conditioning; removing toxic wastes; parking; and perhaps security.

Food premises and equipment that are not kept in good repair and condition are a potential source of microbiological and physical contamination of food. Poorly maintained premises and equipment cannot be cleaned effectively. Poor maintenance may allow the entry of other sources of physical, microbiological and chemical contaminants such as water, pests and dust. Poor maintenance can have health and safety implications for workers. Maintenance may include:

- Hand sharpening
- Cleaning
- Lubricating
- Tightening
- Simple tool repairs and adjustments

3.3 Types of maintenance

Basically there are two types of maintenance known as

- **Preventive maintenance**

Preventive maintenance (including calibration) programme must include all devices used to monitor &/or control food safety hazards & cover the maintenance procedure, frequency & identification of the person (&/or external agency) responsible activity.

- **Corrective maintenance**

shall be carried out in such a way that production on adjoining lines or equipment is not a risk of contamination. Temporary fixes when used shall not put product safety at risk & should be removed/permanently fixed in a timely manner. Lubricants, heat transfer fluids or any other similar material used shall be of food grade where there is risk of direct or indirect contact with the product.

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Conduct regular inspections and maintenance of equipment's. Promptly repair or replace damaged equipment to prevent contamination, such as sieves for sieve integrity.



Table1: Preventive maintenance schedule

S.No.	Name of Machine/ Equipment	Code/ Identification No.	Specification /Supplier	Location of place of the Machine/ Equipment	Frequency of check					Remarks
					Daily	Weekly	Monthly	Half Yearly	Yearly	

Table 2: Preventive maintenance record

S.No.	Maintenance Check Point	Frequency of check					Signature	Remarks
		Daily	Weekly	Monthly	Half Yearly	Yearly		



Self-check 3	Written test
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Name..... ID..... Date.....

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

Test I: Short Answer Questions (3 points each)

1. Differentiate cleaning and maintainance?
2. Describe the different types of cleaning methods?
3. Write the maintainance requirments of equipments?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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Information Sheet 4- Workplace policies and procedures

4.1 Workplace Policies and Procedures

Workplace policies often reinforce and clarify standard operating procedure in a workplace. Well written policies help employers manage staff more effectively by defining acceptable and unacceptable behaviour in the workplace, and set out the implications of not complying with those policies. A policy may allow discretion in its implementation and the basis of that discretion may be stated as part of the policy.

4.2 Workplace policies

Well-written workplace policies include,

- Are consistent with the values of the organisation and employment legislation
- Demonstrate that the organisation is being operated in an efficient and businesslike manner
- Ensure uniformity and consistency in decision-making and operational procedures
- Add strength to the position of staff when possible legal actions arise
- Save time when a new problem can be handled quickly and effectively through an existing policy
- Foster stability and continuity
- Maintain the direction of the organisation even during periods of change
- Provide the framework for business planning
- Assist in assessing performance and establishing accountability
- Clarify functions and responsibilities



Self-check 4	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions(3 points each)

1. What is workplace policies and procedures?
2. List some of the work place policies?

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

Note: Satisfactory rating 6 points	Unsatisfactory below 6 points
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Information Sheet 5- Confirming services an ready for operation

7.1 Services

Common services required to mixing and blending operation

- ✓ water supply
- ✓ power
- ✓ steam
- ✓ fuel
- ✓ vacuum
- ✓ compressed and instrumentation air

5.1.1 Water Supply

Adequate supply of potable water shall be available. This potable water shall be able to meet the standards of IS:10500& shall be tested semi-annually through a recognized lab. Potable water shall be used for cooking, handling food, cleaning equipment & container which come in contact with food, premises in food handling area. Only potable water shall be used for processing/cooking, preparing ice & steam which is used as an ingredient; handling raw food or cleaning food contact surfaces/equipment/plant cleaning. If water is recycled, it shall meet the standards of potable water, if used for the activities mentioned above. Non potable water shall have a separate system. Non potable water shall be identified & shall not connect with or allow reflux into potable water system. Color coding of pipes is recommended. Storage of water & transferring pipes shall be made of food grade material. Storage containers shall be cleaned periodically. Water tanks should be suitably covered to prevent access by animals, birds, pests & other extraneous matters. Water filters shall be regularly changed or effectively maintained.

5.1.2 Compressed air & other gases

Compressed air, carbon dioxide, nitrogen & other gas systems wherever required used in manufacturing &/or packaging shall be constructed & maintained so as to

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prevent contamination. Gases intended for direct or incidental product contact (including those used for transporting, blowing or drying materials, products or equipment) shall be from a source approved for food contact use, filtered to remove dust, oil & water. Where oil is used for compressors and there is potential for the air to come into contact with the product, the oil used shall be food grade. Use of oil free compressors is recommended. Requirements for filtration, humidity (RH%) and microbiology shall be specified. Filtration of the air should be as close to the point of use as is practicable.

5.1.3 Temperature control

Adequate facilities shall be available for achieving & maintaining temperatures required for heating, cooling, chilling, cooking, refrigerating & freezing food. There shall be facility for monitoring & controlling temperatures.

5.1.4 Electrical Panel

In new plants, all socket circuits for hand-held machines must be equipped with additional protection in the form of an FI safety switch with a tripping current of 30 mA. The electrical panels should have rubber mats/shockproof paint flooring below to prevent from any electric shock to any employee working at the station



Self-check 5	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. Write the basic services and utilities of pastry production?
2. Define what mean by services?

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

Note: Satisfactory rating 6 points	Unsatisfactory below 6 points
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Information Sheet 6- Checking and adjusting Equipment performance

6.1 Checking and adjusting equipment performance

After equipment has been installed, the following details need to be addressed before putting the equipment into service:

- Assign responsibility for performing the maintenance and operation programs;
- Develop a system for recording the use of parts and supplies
- Implement a written plan for calibration, performance verification, and proper operation of the equipment;
- Establish a scheduled maintenance program that includes daily, weekly, and monthly maintenance tasks;

Provide training for all operators; only personnel who have been trained specifically to properly use the equipment should be authorized as operators. Designate those authorized to use the equipment and when it is to be used.

6.2 Bakery processing equipments

- **Mixers**

Mixing of the dough is probably the most important event in the bakery, it is where the creative process begins, and is where the quality of the final product is significantly affected by the mixing methodology. Control of mixer speeds and energy directly relates to the dough structure properties

- ✓ Mixer Torque control
- ✓ Energy – kW/kg feedback per mix
- ✓ Dough consistency and repeatability
- ✓ Variable time mix
- ✓ Recipe control

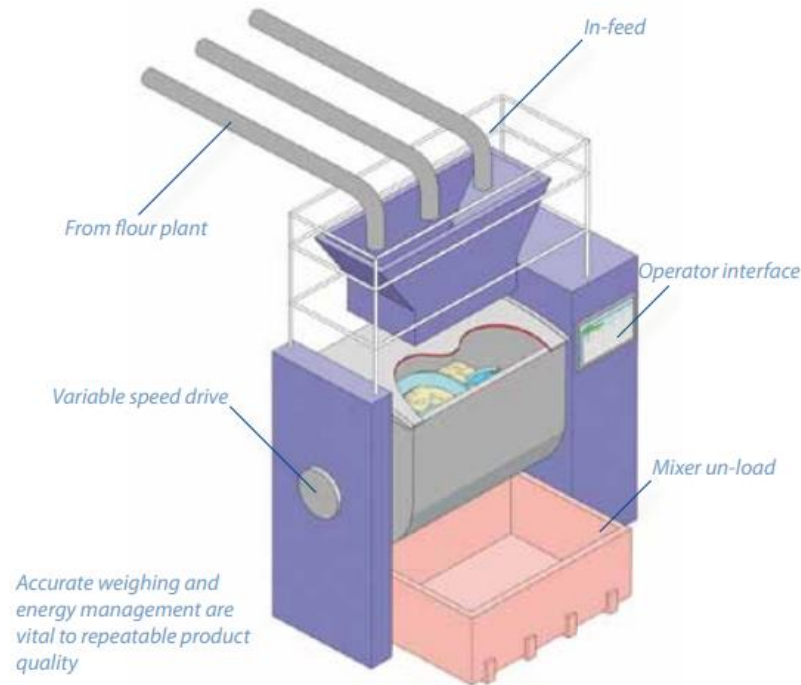


Figure 16 : Mixing machine and components

- **Dough divider**

Careful handling of the dough at the dividing stage is imperative so that there is no damage to the dough structure. Maintaining quality, whilst improving performance are key objectives at this stage of the process. Variable speed drives and servo control technologies provide accurate scaling of the dough and the flexibility to adjust output weights during production. Accurate servo positioning provides easy repeatable product changeover capability, reducing changeover downtime and improving performance. The following parameters are the key issues during operating,

- ✓ Variable product size
- ✓ Weight consistency
- ✓ Safety
- ✓ Gentle treatment of dough
- ✓ Recipe control
- ✓ Changeover time
- ✓ Simple maintenance

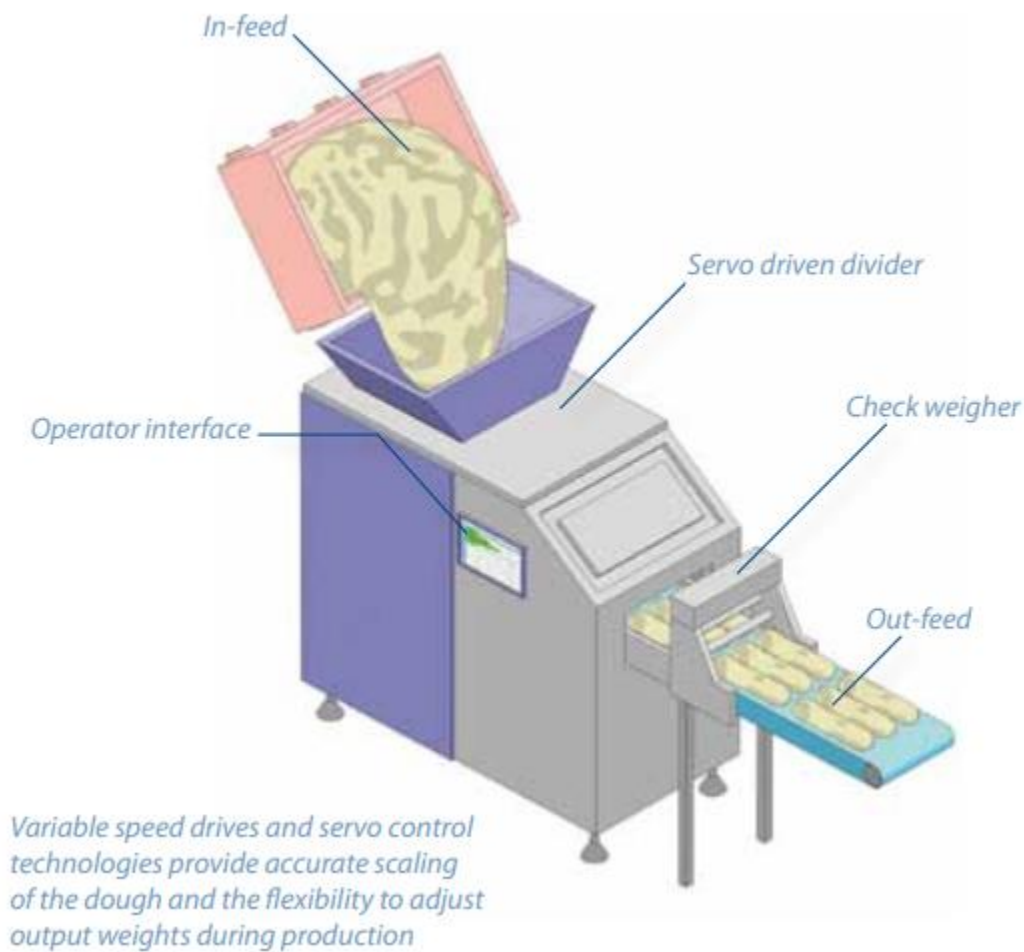


Figure 17: Dough divider and component

- **Cooler**

The cooling stage allows the freshly baked bread to cool to the optimum temperature for slicing and packing. The core temperature of the bread coming out of the oven is over 95o C and it has to be brought down to a maximum of 30° C. To do it too slowly would affect productivity, but to cool the bread too quickly would significantly affect its quality and its slicing characteristics as well as encouraging unnecessary weight loss. Spiral coolers are commonly used in most large bakeries. Loaves are fed through them from the oven and cool by the time they reach the top. Typically, the control system monitors

the temperature and humidity at a number of points in the spiral and adjusts the speed of the conveyor or the forced draught fans to maintain the optimum cooling profile.

Key control issues,

- ✓ Humidity
- ✓ Spiral conveyor
- ✓ Weight loss of product
- ✓ Heat exchange > recovery

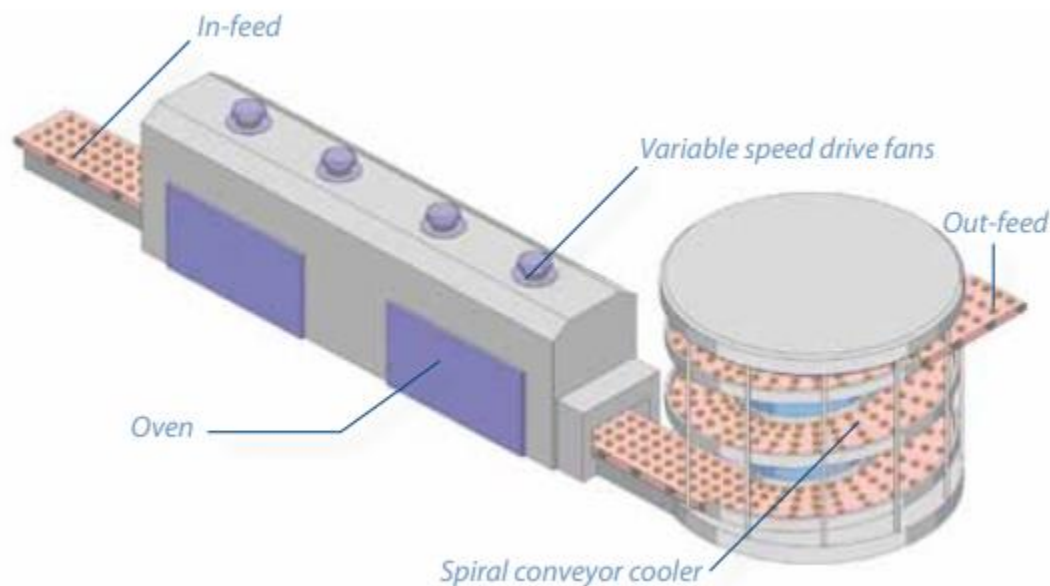


Figure 18: Cooler

- **Slicing and packaging**

The final part of the process before shipping is the slicing and packaging section. The requirement for high speed operation is desired for maximum throughput. The product now has reached its maximum value to the manufacturer so waste reduction at this stage is critical, reduction due to crumb waste and deformation of bread slice is handled using servo control based systems. Labelling for the product track and trace and sell by date requirements need to be managed by the control system, with records and reports for regulatory compliance. Palletising for order make up and final despatch is the last physical activity. For these, safety is paramount. People are



likely to be working in close proximity with complex high speed machinery, active safety control systems ensure the most secure possible working environment.

Key Issues:

- ✓ High speed
- ✓ Slicing
- ✓ Waste/crumb/damage
- ✓ Traceability
- ✓ Lines in slice
- ✓ End of line
- ✓ Sell by date/label/barcode
- ✓ Tray handling
- ✓ Safety
- ✓ Palletising

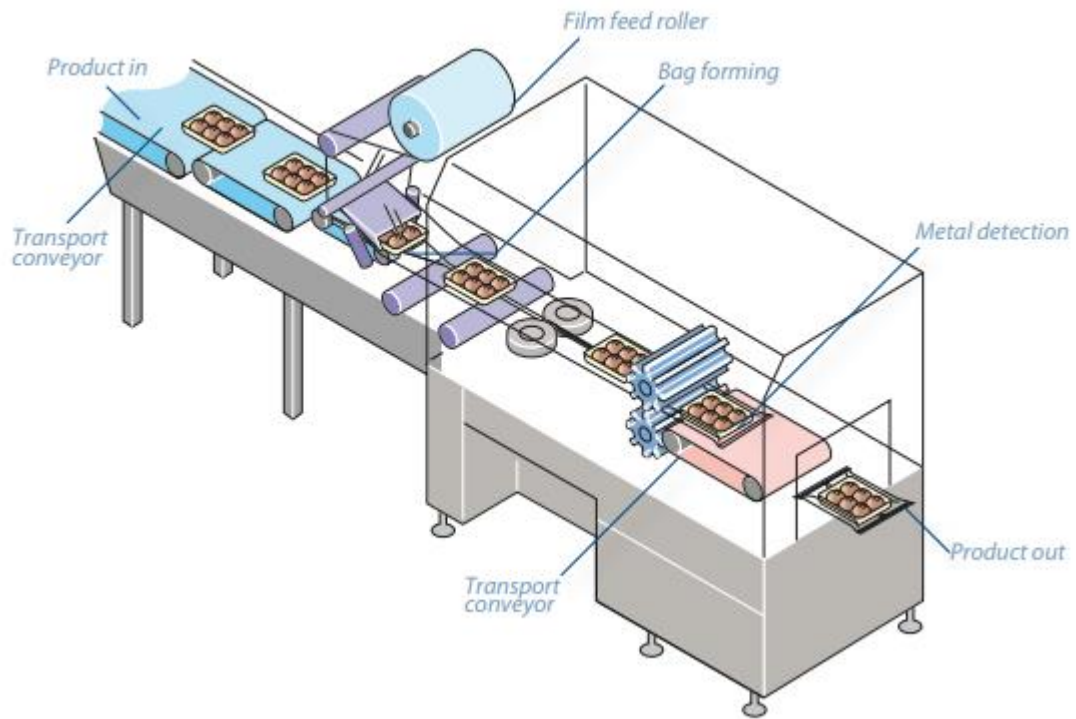


Figure 19: Slicing and packaging machine component



6.3 Importance of checking equipment performance

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.



Self-check 6	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions(3 points each)

1. What is equipment performance measurement?
2. List equipments available in bakery processing?
3. Write the importance of checking performances?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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Information Sheet 7- Set the process with production requirement

7.1 Introduction

Food manufacturers must make sure that their products are safe and do not make people ill. Companies must have a food safety plan and observe the food safety regulations. The government checks that they comply with these requirements. Manufacturers are responsible for producing foods that are safe and reliable. The food sector also has its own internal monitoring systems. Businesses that keep their control systems in good order are inspected less frequently by the NVWA, which can concentrate on companies that do not yet meet all the requirements.

7.2 Manufacturing safety requirements

- All pieces of food contact equipments viz. Dough mixers, conveyors, rounders, dough dividers, racks, proofing equipments, oven, rollers, slicers, sifters etc. should be clean and in good repair.
- All the equipments and their surroundings should be free from dirt, dust and evidence of rodent or insect activity
- All equipments should have smooth edge and devoid of spot welding and any paint flakes.
- Inspection cleaning ports on flour conveyor systems should be accessible and easy to open.
- conveyor systems should be free from pest activity
- Proofing equipment should be free from evidence of insects or rodents
- Temperature and humidity of proofing equipment, ovens and cooling area should be maintained.
- Baking pans or storage bins should be clean Equipments should be cleaned before use
- Utensils like spoons, beaters, pans, bowls, trays, spatulas etc. should be clean and free from adulterants



- Utensils and equipment washing facilities should be clean and adequate and should be kept in a designated place.
- Cleaning agents and compounds should be labelled properly and kept separate from food items to prevent cross-contamination
- Weighing practices should be accurate to ensure the declared quantity of contents would be achieved.
- All high temperature equipment should be equipped with high-temp cut-off devices which cut off the fuel or power source if the upper safe limit is exceeded.
- Working area as well as the outside premises should be free from spilled powders or liquids,
- trash etc. which may attract or harbour pests, rodents or micro-organisms.
- Protective Equipment:
 - ✓ For silo cleaning and for other heavily dust-laden activities, a fine dust Mask should be used
 - ✓ Heat protection gloves should be used in the case of work with ovens

7.2.1 Working practices for reducing flour dust

- ✓ Applying the separating flour on the work surface by sprinkling, rubbing in or with a sieve, instead of by throwing flour (fine dust technique)
- ✓ Gently sweeping of the excess separating flour on the work surface into suitable container, instead of casting it onto the flour
- ✓ Using closed containers for storing flour
- ✓ When using goods in sacks, adding a second pressure relieving cut (on the underside of the sack) when emptying



7.2.2 Premixing

- ✓ Flour should be sieved through minimum 32 mesh and the sieve should be cleaned regularly. If weevils are found, such consignments should be rejected.
- ✓ There should be a periodic cleaning mechanism to prevent cross-contamination and dust generation and to ensure safe collection of unwanted materials like dust, dirt, foreign objects if any.
- ✓ (Good Practices; such as vacuum cleaning, collection of debris through hypochlorite can be used)
- ✓ Sugar to be passed through magnetic grill before use and periodic cleaning of magnetic grill to be ensured.
- ✓ Sugar bags to be free from any external contamination like dust, dirt, rice bran, etc.
- ✓ Egg trays to be free from dirt or pests
- ✓ Broken egg- shells to be stored in plastic bags and disposed off at regular intervals.
- ✓ Fruit cuts to be washed with ozonized water before use.
- ✓ Potassium sorbate to be dissolved thoroughly in water before use. Only freshly prepared sorbate solution to be used.

7.2.3 Mixing

- ✓ Mixing room should be clean & dry without any spillage
- ✓ All mixing utensils should be free from grease and old batter. This is ensured by using washing before use.
- ✓ Mixing bowls, beaters and scrappers to be washed with hot water at least once in 24 hours
- ✓ Egg whisk to be added in mixing through strainer only. The strainer to be cleaned with hot water at least once in each shift followed by swabbing with hypochlorite



solution. The strainer is to be dipped in 500ppm Sodium Hypochlorite solution, when not in use.

- ✓ Mixing room floor to be cleaned with hot water followed by mopping with hypochlorite solution

7.2.4 Air handling unit

- Air handling unit should be maintained inside the pre-slab and oven room. Positive pressure is maintained in the order Pre-slab room > oven room.
- Air is blown inside the oven and Pre-slab room through sets of micro filters – first through 20 micron, then through 10 micron and finally through 5 micron filter for the oven room.
- Additionally the air is passed through Hepa filter for pre-slab room. 20 and 10 micron filters are cleaned by water and 5 micron filter is cleaned by forced air at least once in a fortnight or as required.
- Hepa filter is changed when the same is choked or non-functional.

7.2.5 Baking

- Baking room should be clean & dry. This room is to be mopped with 500ppm Sodium Hypochlorite solution, at least once in each shift
- Ozonizer at the baking room to be maintained at 5gm per hour level
- Cake cooling trolleys are to be mopped with 500ppm hypochlorite solution daily.

7.2.6 Cooling

Room temperature cooling of cakes at ambient room

- This room should be clean & dry and mopping of floor to be done with 500ppm hypochlorite solution at least once in each shift
- After baking, bar cakes are to be transferred immediately to the ambient room
- Positive pressure at ambient room is to be maintained
- Ozonizer at this room is to be maintained at 2gms per hour level



- UV lights to be always put on during cooling of cakes. Personnel entry is to be restricted in this room
- Workmen unloading cakes should use a disinfectant solution to disinfectant their hands.

7.2.7 Forced cooling at slab cooling room

- This room should be clean & dry and weekly sanitization to be done with 500ppm hypochlorite solution
- UV lights should always be put on during cooling of cakes. Personnel entry is to be restricted in this room
- Temperature of this room to be maintained at 8-10 deg Centigrade. The same is to be noted & recorded.

7.2.8 Packaging and storage of finished product

- Only food grade packaging material (printed/unprinted) should be used for wrapping and packaging of food items. The food grade certificate/declaration should be checked in the COA during receiving of the materials.
- Packaging material should also be kept and stored under hygienic conditions in a room intended for the purpose.
- All the products should be labelled according to the Food Labelling Act.
- Immediately after packaging and proper labelling, the products should be placed in the rooms provided for storage under required temperature and humidity conditions.
- Temperature and relative humidity of the storage area should be maintained to optimum required level.
- FIFO system should be applied for dispatch of all products.
- Temperature of cake slabs at the time of packing out from the slab cooling room should be within the range of 14 – 19⁰C
- Packing room temperature is to be maintained at 22-24 deg Centigrade



- Packers handling naked cakes to use sterilized gloves. Disinfectant solutions to be used by all packers as and when required
- Slicer blades & conveyor belts to be sterilized with isopropyl alcohol at least 3 times in each shift or as & when required
- Contact parts of packing machines to be cleaned with 500 ppm hypochlorite solution
- Exposure of UV light on PVC trays, cakes & wrappers to be done during packing
- Metal Detectors to be checked with probes before every start of the packing machine
- Uniform sorbate spray to be done on the top surface of the naked bar cakes before packing.
- Air of sorbate spray line is filtered through the Ultra filter unit, which is checked by the Supplier and changed, if required.

7.2.9 Slicing/packing of bread and confectionary products

- Cool baked products on clean racks and trays. As far as possible, the baked products should be covered during cooling.
- Clear crumbs that are left after slicing the products.
- Use clean packaging to pack the products.
- Control samples must be kept in a separate designated place for each batch of production; required to recheck on the samples during any special situations like customer complaints.
- Finished products must confirm to FSSAI Regulations

7.2.10 Despatch and loading

- The loading of goods should take place in separate rooms and no despatch work must be carried out in garages.
- Sufficient ventilation, with cross-ventilation of the loading room should be maintained.



7.2.11 Retail and display

- Ensure that products are stored in clean display cases which are covered at all times.
- Ensure products are stored at appropriate temperatures (e.g. cakes with fresh cream should be stored in chiller display units at 4°C and below).
- Do not display products with perishable fillings beyond 4 hours at room temperature. Adopt first-in-first-serve approach in the display of products for sale.
- A time stamp is to be used for the products to inform consumers on the “consume-by” date.



Self-check 5	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. Write the manufacturing safety requirements?
2. Describe the different operational requirements of process ?

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

Note: Satisfactory rating 6 points	Unsatisfactory below 6 points
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Operation Sheet 1- Techniques cleaning and maintenance status

1.1 wearing personal protective equipment's(PPE)

- glove
- eye google
- safety shoe
- guan
- hair net

Purpose

To prevent contamination of health supplement products by ensuring that proper cleaning procedure for equipment and accessories in the manufacturing area is clean and tidy place.

1.2 procedures of cleaning and maintenance

Step1. Dismantle all the removable parts of the equipment to be cleaned.

Step2. Adhere “To be cleaned” sticker on the equipment and transfer the removable parts to the designated washing area.

Step3. Clean the immobile part of the equipment according to the manufacturer’s suggested cleaning procedure then fill-out the equipment Log Book after completion.

Step4. Reassemble all the cleaned removable parts to the cleaned equipment after assuring that every part is dried.

Step5. Affix the signed and dated “Cleaned” sticker on the reassembled cleaned equipment. The “Cleaned” sticker must identify previous batch being processed by the equipment.

Step6. Use the cleaned equipment within 72 hours from the date of cleaning. Wipe all product contact parts with clean lint-free cloth prior to next use.

Step 7. If the equipment is not used within 72 hours after the date of cleaning, adhere “To be cleaned” sticker on the equipment and perform cleaning procedure again before use.



LAP TEST	Performance Test
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Name..... ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1 hour. The project is expected from each student to do it.

Task1. Perform cleaning and maintenance operation



LG 49

LO2- Operate the pastry manufacturing process

Instruction sheet

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

- Starting and operating pastry manufacturing process
- Monitoring equipment variations in operating condition
- Identifying variation in equipment operation and maintenance requirement
- Identifying, rectifying and/or reporting Out-of-specification product/process outcomes
- Maintaining work area with housekeeping standards
- Conducting work with workplace information
- Environmental standards and legislative requirements
- Maintaining workplace recording

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 pastry manufacturing process
- Monitor equipment variations in operating condition
- Identify variation in equipment operation and maintenance requirement
- Identify, rectify and/or report Out-of-specification product/process outcomes
- Maintain work area with housekeeping standards
- Conduct work with workplace information
- Environmental standards and legislative requirements
- Maintain 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 pastry manufacturing process

1.1 Introduction

Pastry is a mixture of flour, water and fat combined to make a paste. When combined in different proportions, and by varying mixing methods, these basic ingredients make flexible doughs that can be shaped into a range of shapes to hold a variety of sweet or savoury fillings. Paste is the uncooked pastry mixture with the fat added. It has less water and more fat than the dough which is used for bread and scones.

1.2 Types of pastry

1.2.1 Puff pastry

Pastry dough and fat are laminated together to produce many thin layers of pastry. During baking, water is driven off from gluten in the paste as steam and trapped in the fat layers, blowing the paste layers apart. These inflated layers are set by heat of oven to create a light, puffy, flaky and tender pastry.

Table 4: ingredients and their functions of puff pastry

Ingredient	Function & Specifications
Flour	10–12% protein content with low water absorption. Medium strength; weaker than bread flour but stronger than cake or biscuit flour. Flour needs to be strong enough to form thin layers of pastry, but extensible so that it can be rolled out. Flour must contain enough gluten to hold the crust together to avoid breakage and leaking of the contents.
Water	Amount added is dependent on the water absorption of the flour. Adjusting the amount of water added is the primary method of controlling dough consistency so that the same amount of force is required to roll out the dough as for the fat. Water is chilled to assist with final pastry temperatures.

Fat	Ideally pastry fat is pliable at processing temperatures (20–23oC) but melts in the mouth (37oC) when the final product is consumed, so it requires a slip melting point at 44oC. Fat can be pre-tempered to the same conditions as the pastry dough before machining to assist with mixing.
Salt	Adds flavour and strengthens gluten. Most pastry margarines contain salt so extra salt addition not usually required.
Gluten strengthening	If the flour is so weak that the dough tears, then weak acids such as ascorbic or citric acid can be added to strengthen the dough, although these decrease the dough extensibility. Or extra gluten can be added, which should be mixed in with the flour to ensure it is evenly dispersed.
Gluten weakening	If dough is not elastic or short resting times are needed then reducing agents such as L-cysteine and sodium metabi- sulfite can be added to make the dough more extensible. This makes it weaker, which needs to be monitored as if it becomes too weak it tears easily and damages the layers.

2.2.1 Short pastry

Pastry dough and fat are laminated together to produce many thin layers of pastry. During baking, water is driven off from gluten in the paste as steam and trapped in the fat layers, blowing the paste layers apart. These inflated layers are set by heat of oven to create a light, puffy, flaky and tender pastry.

Table 5: ingredients of short pastry

Ingredient	Function & Specifications
Flour	10–12% protein content with low water absorption. Medium strength; weaker than bread flour but stronger than cake or biscuit flour. Flour needs to be strong enough to form thin layers of pastry, but extensible so that it can be rolled out. Flour must contain enough gluten to hold the crust together to avoid breakage and leaking of the contents.
Water	Amount added is dependent on the water absorption of the flour. Adjusting the amount of water added is the primary method of controlling dough consistency so that the same amount of force is required to roll out the dough as for the fat. Water is chilled to assist with final pastry temperatures.
Fat	Ideally pastry fat is pliable at processing temperatures (20–23oC) but melts in the mouth (37oC) when the final product is consumed, so it requires a slip melting point at 44oC. Fat can be pre-tempered to the same conditions as the pastry dough before machining to assist with mixing.
Salt	Adds flavour and strengthens gluten. Most pastry margarines contain salt so extra salt addition not usually required.
Gluten strengthenig	If the flour is so weak that the dough tears, then weak acids such as ascorbic or citric acid can be added to strengthen the dough, although these decrease the dough extensibility. Or extra gluten can be added, which should be mixed in with the flour to ensure it is evenly dispersed.



Gluten weakening	If dough is not elastic or short resting times are needed then reducing agents such as L-cysteine and sodium metabi- sulfite can be added to make the dough more extensible. This makes it weaker, which needs to be monitored as if it becomes too weak it tears easily and damages the layers.
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3.2.1 Pies

Pies are composed of sweet or savory fillings in baked crusts.

- Pies are generally made in round, slope-sided pans.
- Tarts are similar except they are made in shallow, straight- sided pans.
- Tarts can be almost any shape and often have glazed fruits, piped cream or chocolate decorations

4.2.1 Filo Pastry

This type of pastry (along with finely shredded kadafi pastry, also from the Mediterranean) is made in very thin sheets and used as a casing for numerous delicate savoury and sweet dishes. Made with high gluten content flour, filo is very difficult to make and needs careful handling because it is such a thin, fragile pastry that dries out quickly. Some people prefer to buy readymade filo pastry, but even that is not easy to use. It must be brushed with oil or melted butter/ghee before shaping and cooking. Samosas are deep-fried with spicy fillings, wrapped in filo pastry, and prawns in filo pastry make popular savoury nibbles. This type is similar to strudel pastry.

5.2.1 Suet pastry

Suet pastry is an old fashioned British pastry used for steamed and boiled sweet and savoury puddings, roly-poly puddings and dumplings. Suet pastry is softer than short pastry, which is crispy when cooked. Suet pastry is made from raw beef or mutton fat, especially the hard fat found around the loins and kidneys (suet). Suet has a melting point of 45–50°C which is higher than butter (32–35°C) traditionally used in pastry. This



melting point means that it is solid at room temperature but easily melts at moderate temperatures, such as in steaming. During cooking, water needs to be kept on the boil to avoid a heavy or soggy pastry

6.2.1 Choux pastry

Choux pastry is a light, twice-cooked pastry usually used for sweets and buns. It is made with plain flour, salt, butter, eggs, milk and a little sugar to make profiteroles, éclairs and choux puffs; or without sugar to make savoury pastries.

1.3 Operational methods pastry production

Operational methods address the practices that personnel in a food manufacturing facility follow to prevent food safety issues. They provide the guidelines for a program that will reduce the risk of cross-contamination.

Cross-contamination can occur when employees move from one area of production to another, or when materials and utensils are not color-coded and segregated, labels are not accurate, or the rework procedure is not followed correctly. The FDA guidelines for Good Manufacturing Practices (GMP's) require that all food received by manufacturers be protected from contamination. The program should include the following:

- Label control
- Rework handling
- Identification and handling of scoops, containers, and utensils
- Transfer and handling of materials

1.4 Production safety requirements



Animal hazard

Sharp instrument hazard

Heat hazard

Glassware hazard

Chemical hazard

Electrical hazard

Eye & face hazard

Fire hazard

Biohazard

Laser radiation hazard

Radioactive hazard

Explosive hazard

Clean & Safe At Work

Checklist :



- Wear Your Head Cap
- Wear Your Mouth Mask
- Wear Your Smocks
- Wear Your Gloves
- Wear Your Coat
- Wear Your Safety Shoes

Ready? Now You Can Start Working

Figure 31: Personal protective equipment



Self-check 1	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. Write the difference types of pastry?
2. Describe the roles of different ingredients of pastry?
3. Identify some of the production requirements of pastry?
4. Discuss the processing of pastry?

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

Note: Satisfactory rating 12 points	Unsatisfactory below 12 points
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Information Sheet 2- Monitoring equipment variations in operating condition

2.1 Equipment variation in operating conditions

Machine malfunctions must only be diagnosed and corrected by technicians who are suitably authorised or accredited (in mechanical, hydraulic or electrical work). The prover should always be positioned on a flat, level floor. This is essential for safety reasons and also to ensure that the steaming reservoir is safely and easily replenished with water. The prover should be sited so that its door(s) can be opened to its full extent. This will enable the prover to be loaded and unloaded easily. For best results ensure cleaning and operating instructions are followed meticulously. It is the customer's responsibility to install and maintain an adequate water supply.

Condition maintenance categories condition monitoring maintenance techniques can be organized into the following categories:

- Temperature measurements
- Dynamic monitoring
- Oil analysis
- Corrosion monitoring
- Non destructive testing
- Electrical testing
- Observation and surveillance

Table 1: variations in equipment operation

Malfunction	Possible cause	Remedial action
Abnormal noise from the machine	There is a foreign object in the machine	Remove the object
	A mechanical component has worked loose	Secure the component
	The carrier chains have become slack	Re-tension the chains
	The motor's drive chain has become slack	Re-tension the chain
The balance pans do not advance	There is an electrical power supply fault	Check that the power plug is live (check the fuses or connect another electrical device)
	The emergency stop button is engaged	Reset the stop button (turn and pull)
	The motor's thermal overload switch has tripped	Reset the thermal overload switch then ask a qualified technician to determine the cause of the problem
	The failsafe device protecting the motor's drive has been activated	Something has obstructed the operation of the machine. Resolve the problem then replace the failsafe device.
	The motor drive chain has broken	Replace the chain
	The drive motor has stopped working	Check the wiring and replace the motor if it is defective
	The power supply cable is damaged	Replace the damaged cable

The swing pans do not advance in the right direction	The phases of the electrical supply are inversed	Reverse 2 phases at the connector
The balance pans advance continuously	The position detector is incorrectly positioned	Adjust the detector's position
	The position detector is not working correctly	Check the wiring and change the detector if it is faulty
The balance pans do not stop at the right location	The position detector is incorrectly positioned	Adjust the detector's position
The UV lamp does not light up	The overcurrent fuse has blown	Remove anything that is blocking the air extractor, check the entire circuit then change the fuse
	The UV lamp has burnt out	Replace the lamp
The air extractor does not rotate	The overcurrent fuse has blown	Remove anything that is blocking the air extractor, check the entire circuit then change the fuse
	The extractor's motor has stopped working	Replace the air extractor



Self-check 2	Written test
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Name..... ID..... Date.....

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

Test I: Short Answer Questions (3 points each)

1. What are the factors that cause equipment variation?
2. List type of variations in equipment operation?

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

Note: Satisfactory rating 12 points	Unsatisfactory below 12 points
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Information Sheet 3- Identifying variation in equipment operation and maintenance requirement

3.1 Equipment variation in process operation

A combination of one or more equipment failures, human errors, or both causes a loss of system function. The following factors may influence the likelihood of equipment failure

- Design error
- Faulty material
- Improper fabrication and construction
- Improper installation
- Improper operation
- Inadequate maintenance
- Maintenance errors

3.1.1 High feed rate

The force set up by momentum changes due to the impact of the material flow can cause the trip point to be triggered prematurely. The errors can be reduced by reducing the feed rate, often achieved by retaining high feed rate coarse segments of the weighing cycle to minimise the cycle time, but introducing one or more fine feed segments with lower feed rates. Additionally the physical

3.1.2 Guide to dynamic weighing for industry

layout of the inlet ducts may be engineered to minimise the effect impact forces on the weight measurement. In some applications the presence of a high initial impact force may be overcome by incorporating a time delay into the control cycle to allow the system to ignore it until it dies away.

3.1.3 Delayed cut-off response

This effect is characterised by a compensation weight that decreases the feeder cut-off point to allow for the material that is still falling.

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3.1.4 Inconsistent material flow

This occurs when the material stream flow rate varies such as when the rate pulses because of the design of the screw feeder, if there is partial starvation due to material bridging in the hopper or other material handling issues. Compensation will not easily correct this problem although there is the possibility to add instantaneous feed rate corrections into the in-flight compensation. The solution usually lies in properly designing the hoppers, ensuring a constant minimum head of material and if necessary material flow enhancers.

3.1.5 Miscellaneous factors

There are a number of variables in an automatic weighing operation, which can vary from one weighing cycle to the next - these include: variation in the speed of operation of the cut off mechanisms; material density variation; and vibrations transmitted through the support structure or originating from the vibro-feeders or other motorised equipment mounted on the weighed structure itself.

Table 6: equipment faults and corrective action

Problem	Corrective action
Machine will not turn on	<ul style="list-style-type: none">• Make sure that the power cord is plugged in• Verify that the main power supply is on• act your local authorized service office
Machine will not heat up	<ul style="list-style-type: none">• Verify that the temperature is set properly• Contact your local authorized service office
Machine will not humidify air	<ul style="list-style-type: none">• Verify that the humidity is set properly• Verify that the water supply is turned on to the equipment• Contact your local authorized service office
Machine will not cool	<ul style="list-style-type: none">• Verify that the temperature is set properly.• Contact your local authorized service office.



Self-check 3	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. Write the variations in process operation?
2. Describe the factors cause to equipment variation?
3. Type equipment faults and corrective actions?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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Information Sheet 4- Identifying, rectifying and/or reporting Out-of-specification product/process outcomes

4.1 Out-of-specification product/process outcomes

The term out of specifications, are defined as those results of in process or finished product testing, which falling out of specified limits, that are mentioned in compendia, drug master file, or drug application .The OOS, may arise due to deviations in product manufacturing process, errors in testing procedure, or due to malfunctioning of analytical equipment. When an OOS has arrived, a root cause analysis has to be performed to investigate the cause for OOS. The reasons for OOS can be classified as assignable and non-assignable. When the limits are not in specified limits, called out of specifications.

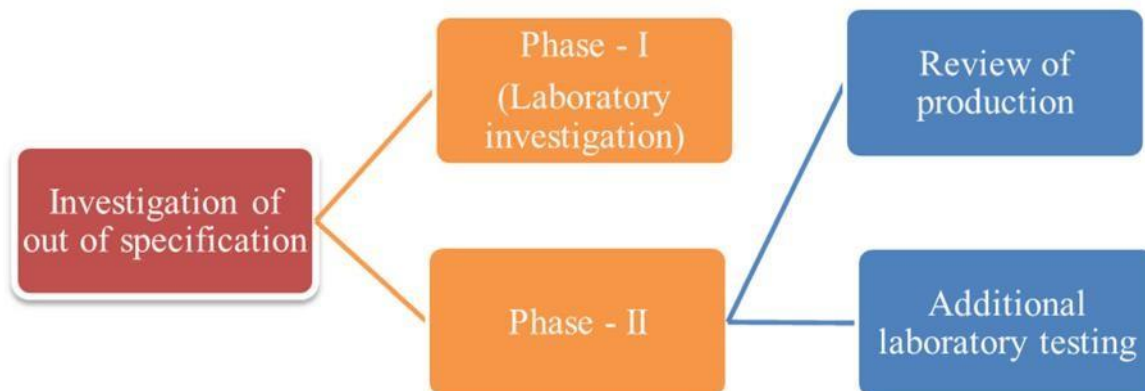


Figure 33: Investigation of OOS results



4.2 Rework & control of non-conforming products

A non-conforming product can be detected through

- Customer complaints
- Internal defect findings
- Internal audits
- External audits
- Incoming material inspections
- Regular testing & inspection activities

These products should either be disposed off or reworked. On conforming that product is non conforming, the product shall be clearly identified, kept labelled & segregated to allow traceability. All traceability records of rework shall be maintained such as product name, production date, batch no etc.

Stored material for rework shall be protected from exposure to microbiological, chemical or extraneous matter contamination.

Where rework is incorporated into a product as an “in-process” step, the acceptable quantity, the process step & method of addition, including any necessary pre-processing stages, shall be defined.

Where rework activities involve removing a product from filled or wrapped packages, control shall be put in place to ensure the removal & segregation of packaging materials & to avoid contamination of the product with extraneous matter.

Handling of Allergen rework/ add back to be done in such a way, that the rework containing allergen shall not cross contaminate non allergen containing food material during processing, handling & storage.

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Self-check 4	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. What is out of specification product?
2. Where do come compliances on non-conforming product?

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

Note: Satisfactory rating 3 points	Unsatisfactory below 3 points
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Information Sheet 5- Maintaining work area with housekeeping standards

5.1 Maintaining the work area with housekeeping standards

Good housekeeping practices in the laboratory have a number of benefits. For example, in terms of safety, it can reduce the number of chemical hazards (health, physical, reactive, etc.) in the laboratory and help control the risks from hazards that cannot be eliminated. Practices that encourage the appropriate labeling and storage of chemicals can reduce the risks of mixing of incompatible chemicals and assist with regulatory compliance. From a security standpoint, order in the laboratory makes it easier to identify items out of place or missing. And finally, good housekeeping can help reduce scientific error by, for example, reducing the chances of samples becoming confused or contaminated and keeping equipment clean and in good working order. Therefore good housekeeping practices are essential for all workplaces, example

- Spills on floors should be cleaned up immediately
- walkways should be kept clear of obstructions
- work materials should be neatly stored
- Any waste should be regularly removed
- Suitable containers for waste should be conveniently located and regularly emptied.

Poor housekeeping can be a cause of incidents, such as:

- Tripping over loose objects on floors, stairs and platforms
- Being hit by falling objects
- Slipping on greasy, wet or dirty surfaces
- Striking against projecting, poorly stacked items or misplaced material
- Cutting, puncturing, or tearing the skin of hands or other parts of the body on projecting nails, wire or steel strapping

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Self-check 5	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. Write some of good house keeping indicators?
2. Describe house keeping records and importances?
3. describe the characterstics of poor house keeping records?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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Information Sheet 6- Conducting work with workplace information

6.1 Workplace information

Each workplace relies on the exchange of information to carry out its daily business. Information is passed from employee to employee, customer to employee, supervisor to team member, supplier to customer, and so on. Dealing effectively with information and records is necessary and important for all organizations. The quantity and variety of information kept by an organisation can be huge. Information needs to be sorted into related groups so that it can be stored easily and found when needed. An organisation success depends largely on how well it manages its information. You need to be familiar with the type of information used in your job and the way records are organised so you can collect, file, store and find information quickly and easily. Finding and using information is a large part of many jobs, so knowing how to deal with it is an important workplace skill. Being confident and efficient in this skill helps you and your organisation succeed.

6.2 Workplace safety procedures

The most important concept to remember is that you are responsible for your own safety and the safety of others. Most safety practices are common sense. Unfortunately, they can be forgotten or overlooked unless you make safe practices a habit or an instinct. General Safety By doing things right, you and your co-workers will commit yourselves to safety on the job and everyone will benefit. Accidents occur in many ways but most often can be traced back to one of two basic factors: ignorance or carelessness. You must always be concerned with your own safety and with the safety of others around you.

6.3 Specification

A specification often refers to a set of documented requirements to be satisfied by a material, design, product, or service. A specification is often a type of technical standard. There are different types of technical or engineering specifications and the term is used differently in different technical contexts. They often refer to particular

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documents, and/or particular information within them. The word specification is broadly defined as "to state explicitly or in detail" or "to be specific."



Self-check 6	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. Define work place procedures?
2. What are work place informations?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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Information Sheet 7- Environmental standards and legislative requirements

7.1 Work place environmental guidelines

workplace hazards include things such as slippery floors, loose floor mats, and sharp knives, as well as hazardous materials. it is important for all employees to be aware of hazards, even if they seem obvious. employers should provide information and training on any safe work procedures related to the job site. safe work procedures are specific directions for doing a task or operating equipment that may pose a risk or hazard to the worker. workers should always ask their supervisor if there are any safe work procedures they need to be aware of and/or any written instructions they should be following. one of the main hazards in any workplace are cleaning products, some of which are everyday products that a person may not regard as hazardous, such as sanitizers and household cleansers. cleaning products and all other materials that are potentially hazardous are governed by the workplace hazardous materials information system.

7.2 Legislative requirements

A person conducting a business or undertaking at a workplace must ensure so far as is reasonably practicable, the following:

- The layout of the workplace allows, and the workplace is maintained so as to allow, for persons to enter and exit and to move about without risk to health and safety, both under normal working conditions and in an emergency,
- Work areas have space for work to be carried out without risk to health and safety,
- Floors and other surfaces are designed, installed and maintained to allow work to be carried out without risk to health and safety,
- Lighting enables:
 - ✓ Each worker to carry out work without risk to health and safety, and
 - ✓ Persons to move within the workplace without risk to health and safety, and
 - ✓ Safe evacuation in an emergency,

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- Ventilation enables workers to carry out work without risk to health and safety,
- Workers carrying out work in extremes of heat or cold are able to carry out work without risk to health and safety,
- Work in relation to or near essential services does not give rise to a risk to the health and safety of persons at the workplace.

Ethiopian food standard code

- Mandatory oil seed and edible oil standard
- Mandatory packaging and labelling standard
- weights and measures legislation
- EFDA (Ethiopian Food and Drug Authority) legislation

legislation of OHS environmental management (Ethiopian Environmental Protection Authority)

Supplier labels When a supplier produces or imports a product for distribution and sale, that supplier must prepare a label that provides the following seven pieces of information:

- ✓ Product identification
- ✓ Supplier identification
- ✓ Hazard symbols
- ✓ Risk phrases
- ✓ Precautionary statements
- ✓ First aid measures
- ✓ A statement advising that an MSDS is available

7.3 Work place requirements

- **Work Layout** : The layout of the workplace is required to allow persons to enter and exit the workplace and move within safely, both under normal work conditions and in an emergency.
- **Entry and Exit**: Entries and exits are required to be safe to allow impeded access and egress for all workers, students and visitors including those with special needs. In particular:

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- ✓ entries and exits should be slip resistant under wet and dry conditions
 - ✓ aisles and walkways need to be at least 600mm wide and kept free of furniture or other obstructions
 - ✓ any walkways, boundaries or pathways shall be marked with 50mm wide with a contrasting colour e.g. white or yellow
 - ✓ open sides of staircases should be guarded with an upper rail at 900mm or higher and a lower rail
 - ✓ handrail should be provided on or at least one side of every staircase
 - ✓ separate entry and exits for mobile equipment e.g. forklifts or trucks, and pedestrians are to be provided
 - ✓ Power operated doors and gates should have safety features to prevent
- **Work Areas** The layout of the work area should be designed to provide sufficient clear space between furniture, fixtures and fittings so workers can move freely without strain or injury also evacuate quickly in case of an emergency. In determining how much space is required, the following should be considered:
 - ✓ the physical actions needed to perform the task
 - ✓ the need to move around while working
 - ✓ whether the task is to be performed from a sitting or standing position
 - ✓ access to workstations
 - ✓ the equipment to be handled and the personal protective equipment that may be worn.
 - **Floors and Other Surfaces** Floor surfaces shall be suitable for the work area and be chosen based on the type of work being carried out at the workplace, as well as the materials used during the work process, the likelihood of spills and other contaminants, including dust and the need for cleaning. In general:
 - ✓ floors shall be free from slip or trip hazards e.g. cables, uneven edges, broken surfaces
 - ✓ floor surfaces shall have sufficient grip to prevent slipping, especially in areas that may become wet or contaminated



- ✓ anti-fatigue matting, carpet, shock absorbent underlay, cushion backed vinyl shall be provided for workers where static standing occurs
 - ✓ carpet shall be properly laid without loose edges or ripples and should be well maintained
 - ✓ Floors should be strong enough to support loads placed on them
- **Workstations** Workstations should be designed so workers are comfortable undertaking their task and allow for a combination of sit and standing tasks. For tasks undertaken in a seated position, workers should be provided with seating that:
 - ✓ Provides good body support, especially for the lower back
 - ✓ Provides foot support, preferable with both feet flat on the floor, otherwise footrest shall be provided
 - ✓ Allows adequate space for leg clearance and freedom of movement
 - ✓ Fully adjustable to accommodate different size workers (e.g. Seat height, back rest height and back rest tilt adjustments) and should not tip or slip utilizing a five-point-base
 - ✓ Chairs shall be fitted with castors for carpeted surfaces and glides or braked castors on hard surfaces
 - **Lighting** Sufficient lighting is required to allow safe movement around the workplace and to allow workers to perform their job without having to adopt awkward postures or strain their eyes to see. Emergency lighting is to be provided for the safe evacuation of people in the event of an emergency. The following factors are to be taken into account:
 - ✓ The nature of the work activity
 - ✓ The nature of hazards and risk in the workplace
 - ✓ The work environment
 - ✓ Illumination levels, including both natural and artificial light
 - ✓ The transition of natural light over the day



✓ Glare

• **Air Quality** Workplace are to be adequately ventilated which includes provision of fresh, clean air drawn from outside the workplace, uncontaminated from flues or other outlets and be circulated through the workplace. Workplace inside buildings may have natural ventilation, mechanical ventilation or air conditioning. An air-conditioning system should:

- ✓ Provide a comfortable environment in relation to air temperature, humidity and air movement
- ✓ Prevent the excessive accumulation of odors
- ✓ Reduce the levels of respiratory by-products, especially carbon dioxide, and other indoor contaminants that may arise from work activities



Self-check 7	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. write the four basic mathematics rule?
2. describe the function of each calculation methods?
3. carry out simple calculation with examples to each types of calculation methods?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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Information Sheet 8- Maintaining workplace recording

8.1 Maintaining workplace records

Records/reports records provide evidence that the relevant specifications and /or instructions have been complied with. Records should be made or completed at the time each action is taken. Any change to a record should be approved, signed and dated by authorized persons.

The level of documentation will vary depending on the product and stage of development. The records should enable the entire history of a batch to be traced. Additionally, the records/reports should form the basis for assessment of the suitability for certification and release of a particular batch.

As a minimum, the following should be documented:

- Receipt records for each delivery of raw materials, starting material, bulk, intermediate as well as primary packaging materials.
- The receipt records should include: - name of the material on the delivery note and the containers as well as any “inhouse name” and or internal code if appropriate, supplier’s name and manufacturer’s name supplier’s batch or reference number total quantity received
- date of receipt unique receipt number assigned after receipt; and any relevant comment.

A batch processing record should be kept for each batch processed; it should contain the following information:

- Name of the product and batch number;
- Dates and times of commencement, of critical intermediate stages, and of completion of production;
- Quantities and batch number of each starting material;
- Quantities and batch number of critical raw materials;

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8.2 Documentation & Records

Appropriate documentation & records including incoming material checks, inspection and testing, calibration of food safety equipments, water testing, operational controls (such as temperature, pressure, time etc.), product recall and traceability, storage, cleaning and sanitation, pest control, medical examination and health status of food handlers, training etc. shall be maintained in a legible manner, retained in good condition for a period of one year or the shelf life of the product whichever is more.

Any changes to records should be traceable (for example, errors are identified by a strike out and followed by initials). Each entry on a record should be signed and dated by the responsible person at the time the specific event occurred.

- Record-keeping requirements and responsibilities should be communicated to staff.
- Records should be kept in a secure location, maintained and readily available for a period of one year or shelf life, whichever is more.

8.3 Record keeping systems

There are certain written records or kinds of documentation that are needed in order to verify that the system is working. These records will normally involve the Implementing Hazard Analysis and Critical Control Point (HACCP) plan itself and any monitoring, corrective action, or calibration records produced in the operation of the Hazard Analysis and Critical Control Point (HACCP) system. Verification records may also be included. Records maintained in a HACCP system serve to document that an ongoing, effective system is in place. Record keeping should be as simple as possible in order to make it more likely that employees will have the time to keep the records.

8.4 The purpose of records

Accurate record keeping is essential to the application of a preventive control plan. Your records should be sufficient to enable you to confirm easily and with confidence that your preventive control plan is implemented and working effectively. Records can also help you improve your preventive control plan by providing a means for you to, for example:

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- Identify the root cause of an issue
- Analyze and improve a process or procedure
- Identify gaps in training and in training needs

The following make up the records of a Hazard Analysis and Critical Control Point (HACCP) Plan

- List of HACCP team and their assigned responsibilities
- Description of each menu item
- Flow diagram for each menu item indicating CCPs
- Hazards associated with each CCP and preventive measures
- Critical limits
- Monitoring procedures
- Corrective actions plans
- Record keeping procedures
- Procedures for verification of the HACCP plan
- Production process
- Variation of results



Self-check 8	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (3 points each)

1. write the use document recording ?
2. describe the record keeping methods?
3. Why need to record documentation?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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Operation Sheet 1- Techniques starting and operating the process

1.1 wearing personal protective equipment's(PPE)

- glove
- eye google
- safety shoe
- guan
- hair net

1.1 Techniques of starting and operating the process

Step 1. Every organization has a standard operating procedure (SOP) for production process

- Production schedule
- Equipment performance check
- Availabilty of raw mterial
- batch size and machine capacity
- Prioritise the work order on the basis of urgency referring to the SOP
- Production of pastry
- Packaging of finished products
- Check the production schedule of the day and note it down in your notepad.

Step 2. Check the availability of raw materials as per the schedule for production.

Step 3. Prioritise the lot which has to be delivered urgently as per the SOP and stock rotation system (FIFO and FEFO) as applicable.

Step 4. Identify the packaging materials required as per the SOP. Once the product is ready, sendit for packaging and storage.



Step 6. Arrange for appropriate packaging as specified in the schedule for the finished products



Operation Sheet 2- Techniques of prepare and maintain work area and process machineries

Personal protective equipment's (PPE)

- glove
- eye google
- safety shoe
- guan
- hair net

2.1 Techniques of preparing and maintain work area and process machineries

Step 1. Prepare the list of machineries present in the processing unit.

Step 2. Execute the cleaning of equipment and machineries as per the SOP.

Step 3. Refer to the manufacturers' manual for recommended cleaning agents and sanitisers.

Step 4. Execute CIP for the internal cleaning of the machines and equipment.

Step 5. Carry out the COP for the parts like fittings, gaskets, valves, tank vents, grinders, pumps, knives and nozzles as per company SOP..

Step 6. Carry out SIP process to sterilise, disinfect and sanitise the machineries.

Step 7. If required apply high air pressure cleaning by removing the equipment parts and replacing them after cleaning.

Step 8. Check for cleaning efficiency by swab test or rinse test.

Step 9. Apply oil and grease to the required parts as part of routine maintenance



Operation Sheet 3 - procedures of housekeeping standard

3.1 wearing personal protective equipment's(PPE)

- glove
- eye google
- safety shoe
- guan
- hair net

3.2 Procedures of housekeeping standard

1. arrange work area
2. Change burned-out light fixtures in work areas, walkways, and exits.
3. Keep floors and work areas clean, dry, and grease-free.
4. Keep steps and ladders in serviceable condition.
5. Keep emergency equipment clean and unobstructed.
6. Ensure that all signs and caution labels are in good condition and visible.



LAP TEST	Performance Test
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Name..... ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **8** hour. The project is expected from each student to do it.

Task1. Apply wearing of personal protective equipment

Task2. Perform starting and operating the process

Task 3. Perform preparing and maintaining work area and process machineries

Task 4. Perform house keeping standards



LG 50

LO- 3 Shut down the pastry manufacturing process

Instruction sheet

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

- Identifying shutdown procedure
- Shutting down the process with 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 shutdown procedure
- Shut down the process with 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 shutdown procedure

1.1 Shutdown procedure

Lock-out procedures work safe regulations require that all powered machinery or equipment shut down for maintenance or repair must be secured against the possibility of the equipment being accidentally turned on while being worked on. To safeguard the person working on such equipment, lock-out procedures must be posted near the equipment, and the procedures listed must be followed before repairs or maintenance can start. Locking out a machine usually means the power feeding the machine is disconnected either by pulling a plug, placing a switch in the off position, or turning a circuit breaker to the off position. The disconnected circuit is then secured in the inoperative position by the use of a padlock. The person doing the maintenance or repair keeps the key to this lock until the work on the machine has been completed. The worker then removes the lock and the machine is again operable.

Depending on the situation, the lock might be used to secure the power switch of the machine or it might be used to lock shut the door to a circuit breaker panel where the thrown breaker is located. If the machine is not wired into its own power circuit but simply plugs into the wall, the lock-out procedure may require that the machine be turned off with its power switch and unplugged from the power receptacle. The plug end of the machine must be kept in plain view of the repair person so no one can inadvertently restore power without the repair person's knowledge.

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Self-check 1	Written test
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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 shut down procedure?
- 2.Write some of the precautions of shut down procedures?

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

Note: Satisfactory rating 10 points	Unsatisfactory below 10 points
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Information Sheet 2- Shuting down the process with workplace procedures

2.1. Shuting down the process

To safeguard the person working on such equipment, lock-out procedures must be posted near the equipment, and the procedures listed must be followed before repairs or maintenance can start. Locking out a machine usually means the power feeding the machine is disconnected either by pulling a plug, placing a switch in the off position, or turning a circuit breaker to the off position. The disconnected circuit is then secured in the inoperative position by the use of a padlock.

2.2. workplace procedures

In the work place to control hazardous energy, you must prevent it from being transmitted from its source to the equipment that it powers. You can accomplish that by doing the following.

- **Identifying energy sources and energy**

isolating devices Identify equipment in your workplace that needs service or maintenance. Determine the types of energy (there may be more than one) that powers the equipment, including potential energy that may remain when the energy sources are disconnected.

- **De-energizing equipment**

Turn off or shut down equipment following established procedures. Stop buttons and on/off switches are used to shut down equipment, not to separate the equipment from its energy sources. The method you use to de-energize equipment depends on the types of energy and the means to control it. After the equipment has been shut down, engage the equipment's energy-isolating devices, physically separating the equipment from the energy. For compressed air, this could mean closing a specific manually operated valve. For an electric motor, this could mean opening a manually operated circuit breaker.

Energy-isolating devices can be:

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- ✓ Disconnect switches (main)
- ✓ Line valves
- ✓ Manually operated
- ✓ electrical circuit breakers
- ✓ Bolted blank flanges
- ✓ Bolted slip blinds
- ✓ Safety blocks
- ✓ Any similar device used to block or isolate energy



Main disconnect switch



Line valve



Motor disconnect

Figure32: energy isolating device

- **Secure energy-isolating devices in a safe position**

When equipment has been shut down, then de-energized using an energyisolating device, nothing will prevent the energy-isolating device from accidentally (or intentionally) being turned on, reopened, or reactivated until it is secured.

Locking out, also known as lockout (LO), is a procedure for physically securing energy-isolating devices in an off, closed, or neutral position. A lockout device typically a lock with a unique key secures the energy-isolating device in a safe position. When an energy-isolating device is secured by a lockout device, it physically prevents the energy-isolating device from being manipulated.

Tagging out, also known as tagout (TO), when performed correctly, is a procedure for securing a warning sign to an energy-isolating device when a lockout device cannot be used.

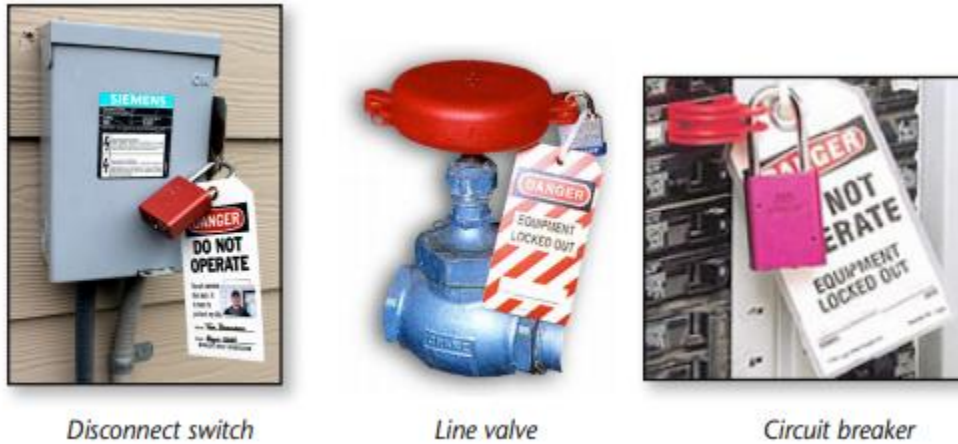


Figure 33: Locked out and tagged out energy-isolating devices

- **Dissipate or restrain potential energy that can't be isolated**

Stored energy must be released or restrained after equipment has been de-energized. Capacitors; coiled springs; elevated machine parts; rotating flywheels; and air, gas, steam, chemical, and hydraulic systems are sources of stored energy. If the energy could return to a hazardous level, make sure that it remains isolated from the equipment until all service work is finished.

- **Verify equipment isolation**

It's your last chance! Verification means purposely confirming that equipment is separated from its energy source; therefore it is "isolated."

The authorized employee must verify that:

- Equipment has been properly turned off/shut down.
- Energy-isolating devices were identified and used to effectively isolate energy.
- Lockout or tagout devices have been attached to the energy-isolating devices.
- Stored energy has been removed or controlled.
- Attempting to restart the equipment is one way to confirm isolation;



- however, testing equipment ensures that capacitors have been properly
- discharged, hazardous heat has dissipated, and excessive pressures have been relieved.



Self-check 2	Written test
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Name..... ID..... Date.....

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

Test II: Short Answer Questions (5 points each)

1. write shut down procedures?

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

Note: Satisfactory rating 5 points	Unsatisfactory below 5 points
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Information Sheet 3- Identifying and reporting maintenance requirements

3.1 Equipment maintenance requirements

- **Fans & Motors**

- ✓ Belts should be check for tightness and wear every three months and replace as necessary.
- ✓ Exhaust fan(s) should be cleaned annually
- ✓ Fan bearings should be lubricated every six months with Lithium-base grease.

Note: do not overgrease as damage to bearings will result

- **Exhaust System**

The exhaust ducts, exhaust fan blades, and exhaust discharge point(s) should be inspect annually for residue build-up and clean as necessary.

- **Fire suppression system**

All fire sprinkler heads should be inspect and clean on a regular basis to prevent residue build-up, thus ensuring proper performance.

- **Controls & Heat Systems**

Electrical connections and motor load currents should be checked annually. If your booth has heated air make-up, you need to have the furnace serviced, cleaned, and re-tuned annually.

3.2 Maintenance reporting requirements

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Table 7: Equipment Breakdown Maintenance report format

S.No.	Name / Code No. of the Machine / Equipment	Location	Nature of Breakdown	Details of repairs carried out	Breakdown Period	Work Done by	Remarks

Table 8: preventive maintainance requirement format

S.No.	Maintenance Check Point	Frequency of check					Signature	Remarks
		Daily	Weekly	Monthl	Half	Yearly		



Self-check 3	Written test
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Name..... ID..... Date.....

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

Test I: Short Answer Questions (3 points each)

1. write the maintenance requirement components of machine?
2. describe the type of actions against the maintainance?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points
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