Cereal processing

Level-II

Based on October 2019, Occupational standards

Version 2

Module Title: Operating Baking Process

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Instruction sheet
This learning guide is developed to provide you the necessary information regarding the following content coverage and topics: • Confirming materials available for operating requirements. • Preparing materials to meet production requirements. • Confirming available services and ready for operation. • Checking and adjusting equipment performance and pans. • Set safety and production requirements process 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 materials available for operating requirements. • Prepare materials to meet production requirements. • Confirm available services and ready for operation. • Check and adjust equipment performance and pans. • Set safety and production requirements process
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 materials available for operating requirements

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 bakery, for example, is an end product, ready for consumption, comprising several raw materials.

Raw materials and other ingredients shall be inspected and segregated or otherwise handled as necessary to ascertain that they are clean and suitable for processing into food and shall be stored under conditions that will protect against contamination and minimize deterioration. Raw materials shall be washed or cleaned as necessary to remove soil or other contamination. Containers and carriers of raw materials should be inspected on receipt to ensure that their condition has not contributed to the contamination or deterioration of food.

Raw materials and other ingredients shall either not contain levels of microorganisms that may produce food poisoning or other disease in humans, or they shall be pasteurized or otherwise treated during manufacturing operations so that they no longer contain levels that would cause the product to be adulterated within the meaning of the act. Compliance with this requirement may be verified by any effective means, including purchasing raw materials and other ingredients under a supplier's guarantee or certification.

Raw materials and other ingredients susceptible to contamination with aflatoxin or other natural toxins shall comply with current Food and Drug Administration regulations, guidelines, and action levels for poisonous or deleterious substances before these materials or ingredients are incorporated into finished food. Compliance with this requirement may be accomplished by purchasing raw materials and other ingredients

under a supplier's guarantee or certification, or may be verified by analyzing these materials and ingredients for aflatoxins and other natural toxins.

Raw materials, other ingredients, and rework susceptible to contamination with pests, undesirable microorganisms, or extraneous material shall comply with applicable Food and Drug Administration regulations, guidelines, and defect action levels for natural or unavoidable defects if a manufacturer wishes to use the materials in manufacturing food. Compliance with this requirement may be verified by any effective means, including purchasing the materials under a supplier's guarantee or certification, or examination of these materials for contamination.

Raw materials, other ingredients, and rework shall be held in bulk, or in containers designed and constructed so as to protect against contamination and shall be held at such temperature and relative humidity and in such a manner as to prevent the food from becoming adulterated within the meaning of the act. Material scheduled for rework shall be identified as such,Equipment, containers, and utensils used to convey, hold, or store raw materials, work-in-process, rework, or food shall be constructed, handled, and maintained during manufacturing or storage in a manner that protects against contamination.

Effective measures shall be taken to protect against the inclusion of metal or other extraneous material in food. Compliance with this requirement may be accomplished by using sieves, traps, magnets, electronic metal detectors, or other suitable effective means. Food, raw materials, and other ingredients that are adulterated within the meaning of the act shall be disposed of in a manner that protects against the contamination of other food. If the adulterated food is capable of being reconditioned, it shall be reconditioned using a method that has been proven to be effective or it shall be reexamined and found not to be adulterated within the meaning of the act before being incorporated into other food.

Compliance with this requirement may be accomplished by any effective means, including one or more of the following:

- Using ingredients free of contamination.
- Employing adequate heat processes where applicable.
- Using adequate time and temperature controls.
- Providing adequate physical protection of components from contaminants that may drip, drain, or be drawn into them.
- Cooling to an adequate temperature during manufacturing.
- Disposing of batters at appropriate intervals to protect against the growth of microorganisms.

Food such as, but not limited to, dry mixes, nuts, intermediate moisture food, and dehydrated food, that relies on the control of aw for preventing the growth of undesirable microorganisms shall be processed to and maintained at a safe moisture level. Compliance with this requirement may be accomplished by any effective means, including employment of one or more of the following practices:

- Monitoring the aw of food.
- Controlling the soluble solids-water ratio in finished food.
- Protecting finished food from moisture pickup, by use of a moisture barrier or by other means, so that the
- aw of the food does not increase to an unsafe level.

Food-manufacturing areas and equipment used for manufacturing human food should not be used to manufacture nonhuman food-grade animal feed or inedible products, unless there is no reasonable possibility for the contamination of the human food.

1.2 Confirming of raw materials

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

1.3 The product specific recommended practices

- **Eggs**
  - ✓ Egg shells should not be cracked upon receipt. Discard cracked eggs.

- ✓ Storage of eggs in chiller until they are needed. When eggs are required to store at room temperature, current batch of eggs to be used with daily replenishment of stock.
- ✓ Washing of hands, utensils and surfaces thoroughly with sanitizing solution and water after handling eggs and before any contact with other food to prevent cross- contamination.

- **Dry ingredients like wheat flour, sugar, milk powders, minor ingredients and cocoa powder**
  - ✓ Sampling and test of incoming raw materials by appropriate test sieves.
  - ✓ Raw material should be stored in a room that has the required humidity and temperature control.

- **Ready-to-eat products containing lightly-cooked or uncooked eggs (e.g. butter, cream, icing, mayonnaise, mousse, condensed milk)**
  - ✓ Only small batches should be procured of what is required. The demand to be estimated to avoid over- production and prolonged storage.
  - ✓ Use liquid egg or egg powder instead of shell eggs where possible.
  - ✓ Cleaning of the drums containing liquid/semi-liquid raw materials for removal of debris and droppings before taking into FBO storage.
  - ✓ Storage of finished products in covered containers in the chiller at 4°C and below.
  - ✓ Storage of finished products on separate shelves above raw food (including shell eggs).

- **Wet ingredients like oils and fats**
  - ✓ Material carried by tanker with broken seal or without seal is not acceptable. Number on the seal is required to match with seal number mentioned in invoice / CoA. This is primarily to prevent adulteration.
  - ✓ For preventing physical contamination, 30 BSS sieve and magnet to be put in the hose at the point of unloading.

- ✓ Use of proper plunger for homogenising the material in tanker or barrel before sampling.

- **Speciality ingredients like nuts and dry fruits**

Nuts received are free from fungal or insect infestation

- ✓ To ensure that adequate measures have been enforced by nut suppliers to keep equipment and processing area infestation free.
- ✓ Prepare a programme for tracking infestation levels supported by action plans for
  - ➢ Sanitatin
  - ➢ Fumigation
- ✓ Periodic fumigation of the receiving room to prevent any possibility of cross contamination of incoming materials due to infestation
- ✓ Nuts are stored below 4°C to assure dormancy of the insect eggs, if any in the nuts

Self-check 1	Written test

Name…… ID…… Date…….

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

Test I: Choose the best answer (4 point)

1. 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

Test II: Short Answer Questions (3 points each)

1. List the common ingridents of baking?
2. Type the quality parameters of ingridents?

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

Note: **Satisfactory rating 8 points**	**Unsatisfactory below 8 points**

Information Sheet 2- Preparing materials to meet production requirements

2.1 Material preparation

2.1.1 Sieving

Sieve all incoming ingredients, intermediates and add backs (if any) through appropriate standard mesh. If sieving is not feasible for example, oat flakes, viscous liquids, manual sorting and visual inspection shall be done. Keep sieved ingredients/ additives in clean and dedicated containers / jars with proper identification, suitably above the floor. The flour is generally sieved before using in bread primarily for following reasons:

- ✓ To aerate the flour
- ✓ To remove coarse particles and other impurities
- ✓ To make flour more homogeneous.

2.2.1 Weighing

Weighing all items must be weighed correctly as required in the recipe, as inaccuracies will affect the quality of the final dish. The next step is weighing of different ingredients as per formulation. Minor ingredients have to be weighed more precisely. Salt, sugar, oxidizing agents and yeast are added in solution form. Yeast is added as a suspension, which is mixed well each time before dispensing. Sequence of addition of ingredients also affects the dough characteristics. Generally shortening and salt are added after the clean up stage.

2.3.1 mixing

Mixing of flour and ingredients involves i.e. hydration & blending, dough development and dough breakdown. The process of mixing begins with hydration of the formula ingredients. The mixing, whilst the flour is hydrating, brings about development of the gluten network in dough, which is evidenced as an ascending part of the mixing curve. The dough system subsequently becomes more coherent, losing its wet and lumpy appearance, and it achieves a point of maximum consistency or minimum mobility. This

is the point to which dough should be mixed for producing bread of superior loaf quality. At this stage the dough is converted into a viscoelastic mass from thick and viscous slurry. At this stage the gluten forms a continuous film or sheet suitable for processing into bakery applications. If mixing is continued beyond this point, mechanical degradation of the dough occurs resulting in the breaking down of the dough network. Eventually the dough becomes wet, sticky and extremely extensible, and is capable of being drawn out into long strands. This is generally referred to as the dough being 'broken down'. Such dough will create problem in dough handling and frequent break down in the plants and ultimately results into processing losses.

2.4.1 Fermentation

Optimally mixed dough is subjected to fermentation for a suitable length of time to obtain light aerated porous structure of fermented product. Fermentation is achieved by yeast (Saccaromyces cerevisiae). The yeast in dough breaks down the sugars to carbon dioxide and ethanol. The gas produced during fermentation leavens the dough into foam. The foam structure of dough is discrete and has stability during fermentation. When fermented dough is baked, the foam structure gets converted into sponge structure that is responsible for aerated structure of breadcrumb. The conditions under which fermentation occurs affect the rate of carbon dioxide production and flavour development in the dough. The temperature and relative humidity conditions are particularly important for yeast activity and gas production. In the temperature range of 20 to 40ºC, the yeast fermentation rate is doubled for each 10ºC rise in temperature. Above 40ºC yeast cells are started to get killed. The yeast performs well at 30-35ºC and relative humidity of 85 % and above. The optimum pH range for yeast is 4 to 6. Below pH 4 the yeast activity begins to diminish and it is inactivated below pH 3. Osmotic pressure also affects the activity of yeast.

2.5.1 Knock back

Punching of dough in between the fermentation periods increases gas retaining capacity of the dough. The knock back has the objectives of equalizing dough temperature throughout the mass, reducing the effect of excessive accumulation of

carbon dioxide within the dough mass and introduces atmospheric oxygen for the stimulation of yeast activity. The knock back also aids in the mechanical development of gluten by the stretching and folding action. Usually knock back is done when 2/3 of the normal fermentation time is over.

2.6.1 Dough make-up

The function of dough make-up is to transform the fermented bulk dough into properly sealed and moulded dough piece, when baked after proofing it yields the desired finished product. Dough make-up includes (a) scaling; (b) rounding, inter-mediary proof and moulding.

2.7.1 Scaling or dividing

The dough is divided into individual pieces of predetermined uniform weight and size. The weight of the dough to be taken depends on the final weight of the bread required. Generally, 12% extra dough weight is taken to compensate for the loss. Dividing should be done within the shortest time in order to ensure the uniform weight. If there is a delay in dividing, corrective steps should be taken either by degassing the dough or increasing the size of the dough. The degassers are essentially dough pumps which feed the dough into the hopper and in the process remove most of the gas. The advantages of using degassers are:

- more uniform scaling
- uniform pan flows and
- uniform grain and texture of bread.

2.8.1 Rounding

When the dough piece leaves the divider, it is irregular in shape with sticky cut surfaces from which the gas can readily diffuse. The function of the rounder is to impart a new continuous surface skin that will retain the gas as well as reduce the stickiness thereby increasing its handling. Rounder are of two types i.e. umbrella and bowl type.

2.9.1 Intermediate proofing

When the dough piece leaves the rounder, it is rather well degassed as a result of the mechanical it received in that machine and in the divider. The dough lacks extensibility and tears easily. It is rubbery and will not mould easily. To restore more flexible, pliable structure which will respond well to the manipulation of moulder, it is necessary to let the dough piece rest while fermentation proceeds. Intermediate proofer contains a number of trays that are chain driven. The dough piece is deposited in the tray with completed number of laps at predetermined rate. Average time at this stage ranges from 5 to 20 min.

2.10.1 Moulding

The moulder receives pieces of dough from the inter-mediate proofer and shapes them into cylinders ready to be placed in the pans. Moulding involves three
separate steps

- sheeting
- curling
- scaling.

Sheeter degasses the dough and sheeted dough can be easily manipulated in the later stages of moulding. Sheeting is accomplished by passing the dough through 2 or 3 sets of closely spaced rolls that progressively flatten and degas the dough. The first pair of rolls is spaced about 0.25" apart where the degassing takes place. The successive two rollers are spaced 0.125" and 0.06" apart for optimum grain and texture development in the finished products. The sheeted dough piece next enters the curling section. A belt conveyor under a flexible woven mash chain that rolls into a cylindrical form carries the sheeted dough. The rolling operation should produce a relatively tight curl that will avoid air entrapment. The curled dough piece finally passes under a pressure board to eliminate any gas pockets with in and to seal the same.

2.11.1 Panning

The moulded dough pieces are immediately placed in the baking pans. Panning should be carried out so that the seam of the dough is placed on the bottom of the pan. This will prevent subsequent opening of the seam during proofing and baking. Optimum pan temperature is 90°F.

Self-check 2	Written test

Name…… ID…… Date…….

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

Test I: Choose the best answer (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. List the ingridients to be prepared for baking?
2. Describe the raw material preparation methods?

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

Note: **Satisfactory rating 8 points**	**Unsatisfactory below 8 points**

Information Sheet 3- Confirming available services and ready for operation

3.1 Services available for operation

Common services required to mixing and blending operation

- water supply
- Electrical panel
- Temperature control
- Power
- Steam
- Fuel
- Vacuum
- Compressed and instrumentation air

- **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.

- **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 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.

- **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.

- **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 3	Written test

Name…… ID…… Date…….

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

Test I: Short Answer Questions (3 points each)

1. List services required for baking operation?
2. Describe the different types services and functions for operation?

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

Note: Satisfactory rating 6 points	Unsatisfactory below 6 points

Information Sheet 4- Checking and adjusting equipment performance and pans

4.1 Checking and adjusting equipment performance and pans

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.

4.2 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 andrepeatability
- ✓ Variable time mix
- ✓ Recipe control

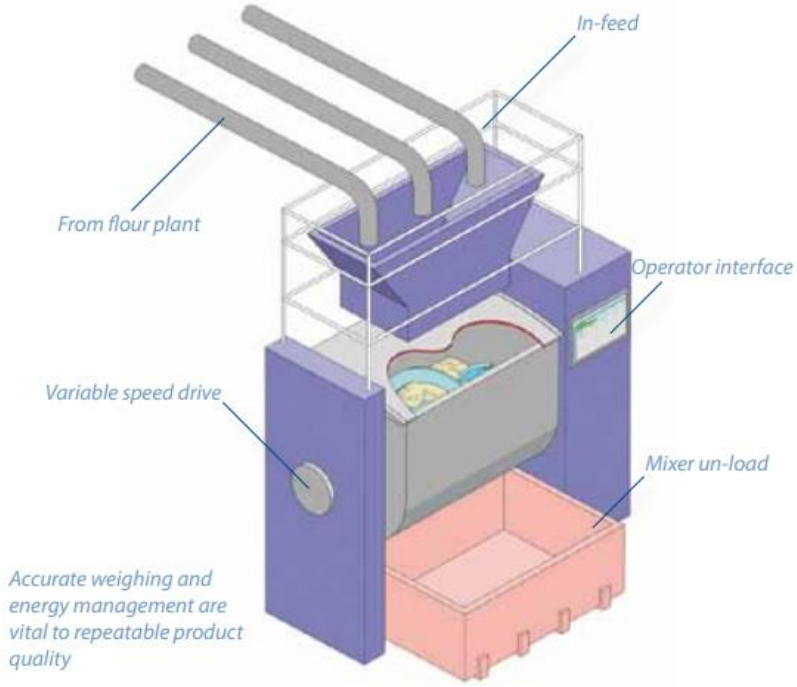


Figure 1 : Mixing machine and components

- **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 parametrs are the key issues during operating,

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

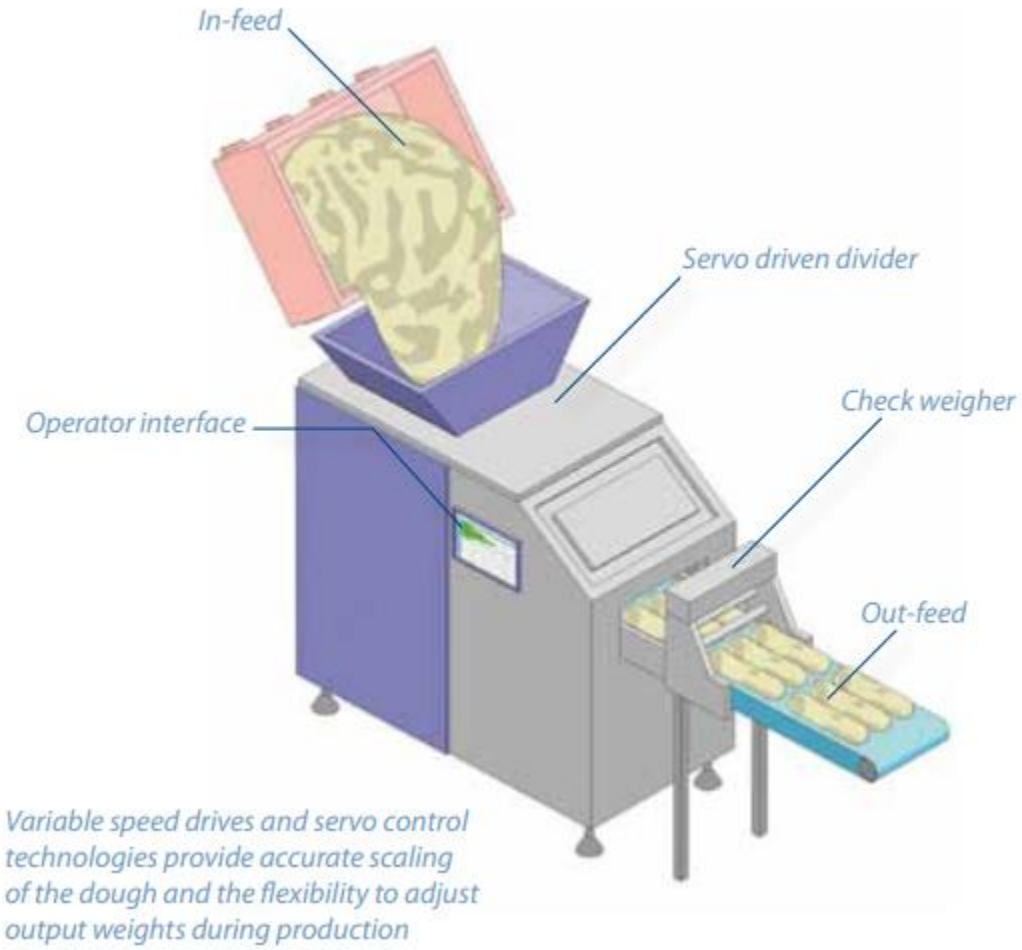


Figure 2: Dough divider and component

- **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^{o} 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

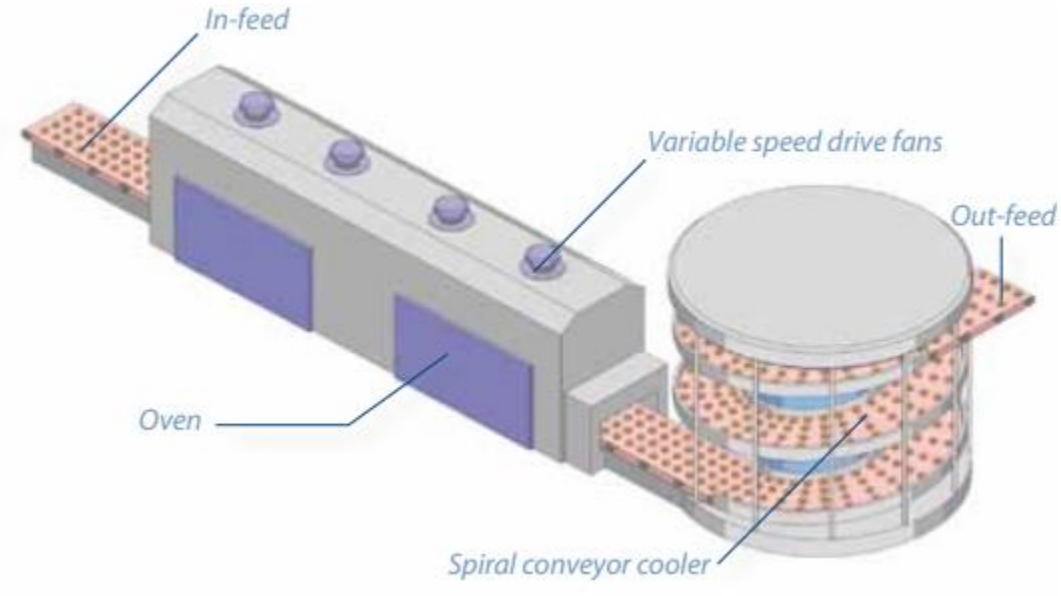


Figure 3: Cooler

- **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

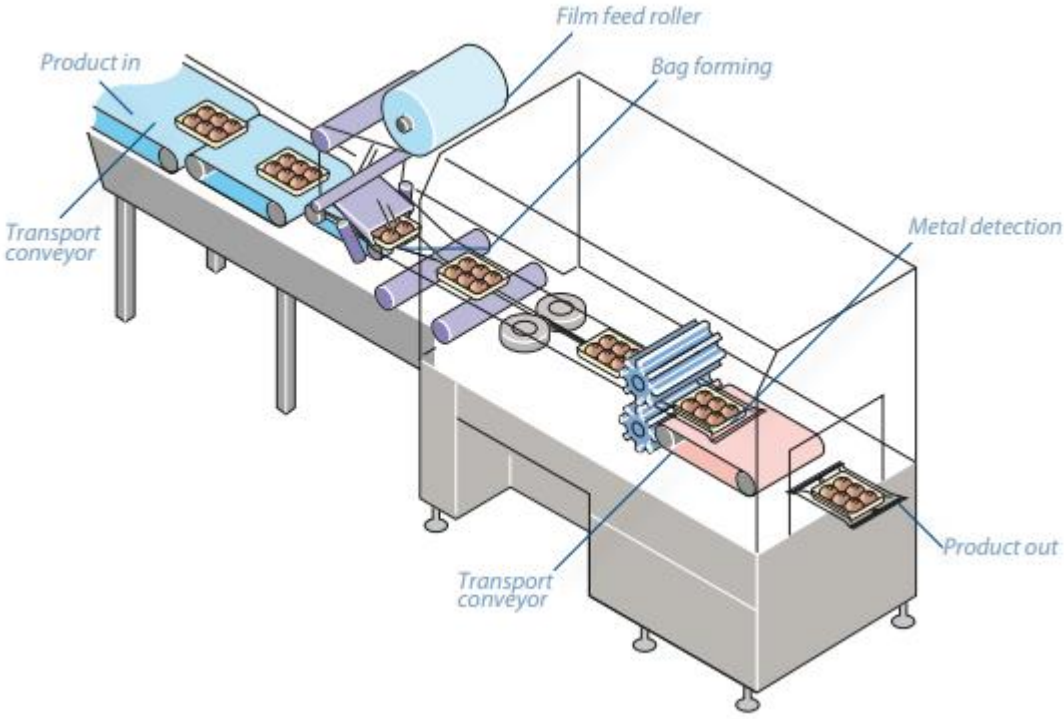


Figure 4: Slicing and packaging machine component

4.3 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 4	Written test

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**

Information Sheet 5- Set safety and production requirements process

5.1 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.

5.2 Manufacturing safety requirments

- 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

5.2.1 Working practices for reducing flour dust

- ✓ Applying the separating flour on the work surface bysprinkling, 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

5.2.2 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 should 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.

5.2.3 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

5.2.4 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.

5.2.5 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.

5.2.6 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.

5.2.7 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.

5.2.8 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 – 19^0C
- 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.

5.2.9 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 crumbles 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

5.2.10 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.

5.2.11 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 4ºC 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.

5.3 Loading/ Unloading related to food safety & quality

- **Control of storage conditions**
  - ✓ Specifications for Warehousing & Storage shall be used to describe the conditions required.
  - ✓ Where specified, monitoring of temperature and humidity must be carried out using calibrated recording equipment. A reporting system with corrective action plans for out of range results shall be defined. Terms in common use are:
    - Ambient Storage: Prevailing conditions with no control over temperature or humidity required or expected.
    - Dry Storage: Prevailing conditions controlled to avoid absorption of humidity from air.
    - Temperature range 15 to 25°C (59 to 77 °F), relative humidity < 65%.
    - Conditioned Storage: Temperature controlled within a defined range of 10 to 20°C (50 to 68°F). Humidity 65% maximum.

- **Control of transportation conditions**
  - ✓ Where temperature ranges are specified for storage these shall also apply to transportation.
  - ✓ Effective operation of vehicle chiller units shall be verified by temperature measurement.
  - ✓ Assembly & Dispatch: Documented procedures defining shipping parameters for all stages of the distribution process shall be in place.
  - ✓ Procedures for reporting stock or delivery issues (e.g. shortages, delayed deliveries) shall be taken into consideration.
  - ✓ Transportation: Vehicles must be clean, free from odours, and be fitted with appropriate temperature control and monitoring devices where required.

Self-check 5	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions (3 points each)

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

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

Note: **Satisfactory rating 6 points**	**Unsatisfactory below 6 points**

LG 52	LO2- Operate the baking process

Instruction sheet

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

- Starting and operating baking process with policies and procedures
- Loading product into oven and baking specification
- Monitoring equipment in operating conditions
- Variations in equipment operation and reporting maintenance requirements
- Identifying, rectifying and/or reporting out-of-specification product/process outcomes
- Maintaining work area with housekeeping standards
- Conducting work with workplace information
- Environmental guidelines and legislative requirements
- Maintaining Workplace with work place recording 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:

- Start and operate baking process with policies and procedures
- Load product into oven and baking specification
- Monitor equipment in operating conditions
- Variations in equipment operation and reporting maintenance requirements
- Identify, rectify and/or report out-of-specification product/process outcomes
- Maintain work area with housekeeping standards
- Conduct work with workplace information
- Environmental guidelines and legislative requirements
- Maintain Workplace with work place recording 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- Starting and operating baking process with policies and procedures

1.1 Introduction

Baking is a millennia old process, and bakery products range in complexity from the simple ingredients of a plain pastry to the numerous components of a cake. Baking is at heart a process the conversion of some relatively unpalatable ingredients into the aerated, open cell sponge structureThe term baking applies not only to the production of bread, but to all food products in which flour is the basic material and to which heat is applied directly by radiation from the walls and/or top and bottom of an oven or heating appliance. Baking includes production of items like: Bread, cake, pastry, biscuits, crackers , and Cookies. Where flour is the essential and principal ingredient for the product However, bread is probably the oldest processed food. Although many differences exist between bakery products, they share two important issues of baking technology:

- baking ingredients
- baking techniques

The baking process After proofing the dough is subjected to heat in a baking oven. Baking temperature generally varies depending up on oven and product type but it is generally kept in the range of 220-250ºC. During baking the temperature of dough centre reaches to about 95ºC in order to ensure that the product structure is fully set. When the dough is placed in the oven, heat is transferred through dough by several mechanisms such as convection, radiation, conduction, and condensation of steam and evaporation of water. Heat transfer inside dough is said to occur through the mechanism of heat conduction and evaporation/condensation. The baking time of bread may range from 25 to 30 minutes depending up on size of bread loaf. After baking, bread is cooled prior to packaging to facilitate slicing and to preventcondensation of moisture in the wrapper. Desirable temperature of bread during slicing is 95-105°F.

1.2 Basic ingridents of bakery

Bread and many other baked products have flour, water, leavening agents and salt as basic ingredients. Two of these ingredients, flour and leavening agents, are responsible for the most important characteristics of the finished products. Other optional ingredients can also be added to alter the flavor, appearance and keeping qualities of the bread. The essential ingredients in yeast-leavened bread are:

- wheat flour
- water
- leavening agents
- salt

optional or nonessential ingredients

- allow the baker to compensate for flour deficiencies and the production procedures chosen and to extend shelf life
- They may also add desirable color or flavor attributes that improve consumer acceptability.

Table 1. basic ingridents and their functions

Flour	Is the major ingredient in making bread. It provides the structural frame work of the bread because it contains gluten, which gives the bread strength to keep its shape when baking
Yeast	Is the leavener used in bread making. Yeast acts with the sugar in water to form carbon dioxide which will make the bread rise. Two kinds of yeast are compressed or fresh yeast and dry yeast
Sugar	Is added as food for the yeast and also for flavor. It also helps in browning the crust.
Salt	Does not only improve or enhance the flavor of the bread it also controls the growth of the yeast to prevent over rising of the dough.
Liquid	Such as water, milk, and juice, is needed to hydrate and bind the flour, to develop the gluten, and to dissolve the yeast
Egg	Is added to make bread tender, rich in flavor, and golden brown in color. It acts as an aeration medium.
Fats and oils	In the form of oil, butter, margarine, or shortening, is added to enrich the dough and to keep it soft. It gives the bread a moist crumb with a soft crust.
Other ingredients	like dried fruits and nuts, cheese, and flavorings to make the product more flavorful.

1.3 Functions of baking

All bread making processes are developed keeping in view to achieve the following

- Development of a gluten network in the dough to retain gas and produce spongy bread texture.
- Incorporation of air bubbles within the dough during mixing.
- Creation of particular flavour compounds in the dough.
- A preliminary modification of the shape of the divided dough pieces.
- Fermentation and expansion of the shaped dough pieces during proofing.

Further expansion of the dough pieces and fixation of thefinal bread structure during baking. The main differences between individual and groups of bread making processes are normally associated with mixing and kneading, air incorporation, and the creation and development of the gluten structure. The processing stages such as scaling, proving and baking, are common to most bread making processes and differences between individual bakeries tend to be in the type of equipment used and small variations in conditions that are applied in the bakery equipment, e.g. time and temperature.

1.4 Change occur during baking

Several stages can be distinguished during the changes from dough to a baked product. They are as follows,

- Enzyme active stage (from 30oC to 70oC).
- Stage of starch gelatinization. (From 55oC to 70oC)
- Stage of water evaporation
- Stage of browning and aroma formation

Chemical and physical changes

When the dough is put in the oven, the rate of fermentation initially increases as heat is conducted through the dough. Upto 50oC, yeast produces CO2 and ethanol at an increasing rate. At the same time the viscosity of dough falls rapidly and reaches to

minimum at about 60oC. At the same time thermal expansion of gas within each cell result in rapid expansion of loaf volume, known as “oven spring”.

As the internal temperature of the dough increases above 37oC, activity of yeast decreases and gets inactivated at 54oC. At the same time, beyond 60oC, viscosity of dough again increases rapidly. This increase is caused by swelling of starch accompanied by release of amylose and also by protein denaturation. As the crumb starch gelatinizes at 65oC, the α and β-amylase present will attack the starch. The amylolytic activity continues until their enzymes are inactivated at about 74oC. A optimum amylolytic activity is desirable to limit the degradation of gelatinized starch to counteract staling of bread. At the same time the denatured protein, swollen and partially gelatinized starch forms a stable crumb network at about 74oC. This transformation continues until the end of baking when the internal temp reaches to 93 - 100oC. During this time gluten looses its tough and elastic state and becomes stiff and brittle. This stiffens the starch structure so that a firm elastic crumb is formed. The starch granules of crust surface gelatinize almost completely. This is specially the case when “oven humidity” is high; the resultant starch film produces a pleasing glaze. This also retards drying and settling of the crust and permits full expansion of dough.

The above process results in tremendous increase in the tensile strength of the dough and the increase the presence of gas bubbles. Consequently the membrane gives way and becomes permeable, allowing H2O, CO2 & ethanol to evaporate. This results in baking weight loss. The internal temperature never exceeds 100oC but the outer temperature reaches nearly the oven temperature (~200oC). Thus water evaporates more from the surface & the crust is formed. This results in weight losses during crust formation upto 8-14% of the fresh dough weight.

1.5 Operational methods bakery 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

Self-check 1	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions (3 points each)

1. Writie the difference ingrident of baking?
2. Describe the roles of different ingridents in baking?
3. Identify some of the changes occur during baking?
4. Discuss thefunction of baking?

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

Note: **Satisfactory rating 12 points**	**Unsatisfactory below 12 points**

Information Sheet 2- Loading product into oven and baking specification

2.1 Loading product into oven and baking

2.2 Biscuit baking process

The starting point must be an understanding of the ingredients and the baking process. The following section outlines the process, the changes that take place from the dough piece to the biscuit during baking and the factors that influence the baking process and the quality of the end product.

Figure 5: Loading biscut in to oven

- **Biscuit structure**

Our aim is to bake a high quality biscuit. The following characteristics are important:

- ✓ Texture – open, flaky, short, depending on the product
- ✓ Density/volume – low density gives more volume and a lighter bite
- ✓ Bite/mouth feel – crispiness, softness, smoothness, crunchiness...
- ✓ Flavour – many flavours and fillings are heat susceptible and the protection of the flavours and texture of the fillings needs consideration for the baking

process. For example, for a variety of soft doughs and cookies, a preference will be given for radiant heat, a longer baking time at a lower temperature

Figure 6:Different baking time temperature requirments of biscuit

- **Moisture content**
  - ✓ Important factor in baking doughs with high water content, such as crackers and water biscuits.
  - ✓ Low moisture content enhances the keeping qualities of the biscuit.

Evenness of the moisture content from the centre to the outside of the biscuit requires penetrative heat and adequate time for baking and cooling to avoid “checking” (cracks in the biscuits after packing).

- **Colour**
  - ✓ Consistency of colour with time and across the width of the oven band
  - ✓ Some products, such as marie require a very even bland colour, other such as cream crackers and some rotary moulded designs require colour contrasts and highlights. These features require different baking systems to enhance the appearance of the product.

Figure 7: Different baking systems of biscuit

Table 2 : Ingridents specification of biscuit

Property	Soft flour %	Medium flour %	Strong flour %
Protein	8.0	10.3	13.2
Wet gluten		26.0	31.0
Fat		1.0	2.4
Carbohydrate		76.3	66.9
Ash	0.3	0.5	0.5
Water absorption	53.0	58.0	60.0

2.3 Baking process of bread

Table 3 : Bread formulation (using 100 grams of flour) and specification

Ingredient	Baker's % (based on flour weight)
Bread flour*	100.0
Water	59.0–65.0**
Fresh yeast (compressed)	5.3***
Sugar (refined granulated sucrose)	6.0
All-purpose shortening	3.0
Salt, NaCl (chemically pure)	1.5
Diastatic malt (malted barley flour)	0.2–0.3****

Ascorbic acid (optional)	40–90 ppm
Potassium bromate (optional)	10–20 ppm
Nonfat dry milk, emulsifiers, reducing agents, enzymes (optional)	Levels vary according to test purposes

2.4 Processing stage

- Mixing
- Dividing/scaling (for multiple dough batch) and rounding (optional)
- Bulk fermentation
- Sheeting and moulding
- Panning
- Final proofing
- Baking
- Cooling
- Bread evaluation (scoring

2.5 Processing specifications

- Mixing
  - ✓ Place dry ingredients in mixing bowl first, then add liquids. Avoid placing salt on top or next to yeast
  - ✓ Mix to full gluten development. Record mixing time
  - ✓ Time: depends on flour strength, quantity of functional polymers and mixing speed. Check final point by performing a gluten film test
  - ✓ Final dough temperature: temperature of water should be adjusted to give dough out of mixer at 84 ± 1°F (29 ± 0.5°C)
- Bulk fermentation

- ✓ Time: fermentation time may vary from 60 to 180 min (90 min is recommended)
- ✓ Temperature: 82°F (28°C)
- ✓ RH: 85%
- ✓ Punching (degassing): punching or lamination of dough at 58, 86 and 100% of fermentation time

- Sheeting and moulding
  - ✓ Sheeting and moulding can be performed by using a custom-made moulder or it can be carried out manually
- Panning
  - ✓ Place the moulded dough pieces on baking pans previously greased
- Final proofing
  - ✓ Time: Proofing time may vary from 24 to 60 min (33 ± 2 min is recommended for optimum height)
  - ✓ Temperature: 82°F (28°C)
  - ✓ RH: 85%
- Baking
  - ✓ Time: 20–24 min (bake to an internal temperature of 204°F or 95°C
  - ✓ Temperature: 419°F (215°C)

Self-check 2	Written test

Name…… ID…… Date…….

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

Test I: Short Answer Questions (3 points each)

1. Describe the different ingrident specifications of biscuit?
2. List the baking effects on the color and moisture of baked products?

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

Note: **Satisfactory rating 6 points**	**Unsatisfactory below 6 points**

Information Sheet 3- Monitoring equipment in operating conditions

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

- High feed rate
- Guide to dynamic weighing for industry
- Delayed cut-off response
- Inconsistent material flow
- Miscellaneous factors
- 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.

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 4: equipment faults and corrective action

Machine will not turn on	• 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	• Verify that the temperature is set properly. • Contact your local authorized service office.
Machine will not humidify air .	• 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.	• Verify that the temperature is set properly • Contact your local authorized service office.

3.2 Equipment variation

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

How is oven temperature controlled

Specific temperatures are set inside the baking chamber to achieve the required baking profile of a given product. Controlling the heat input from the energy sources (e.g., burners, electric resistances) is then vital for maintaining the set baking temperatures. Control of oven temperature can be achieved by two means:

- **Automatically**
  - ✓ A temperature sensor (thermocouple probe) senses, measures, and transmits the temperature (controlled variable) of the air inside the baking chamber.
  - ✓ As the demand for hot air increases or decreases (e.g., in moments when the load of the oven increases, oven temperature goes down; fuel combustion must then increase to return oven temperature to its set point).
  - ✓ A change in oven temperature is sensed and converted to an electrical signal, amplified, and sent to a controller that evaluates the signal and sends a correction signal to an actuator.
  - ✓ The actuator (gas valve) opens or closes to adjust the flow rate of the air and fuel (carbureted mixture) in the burner (manipulated variables) to keep flame intensity such that it can consistently deliver the power required. In this way, the temperature of the baking chamber is returned to its predetermined value

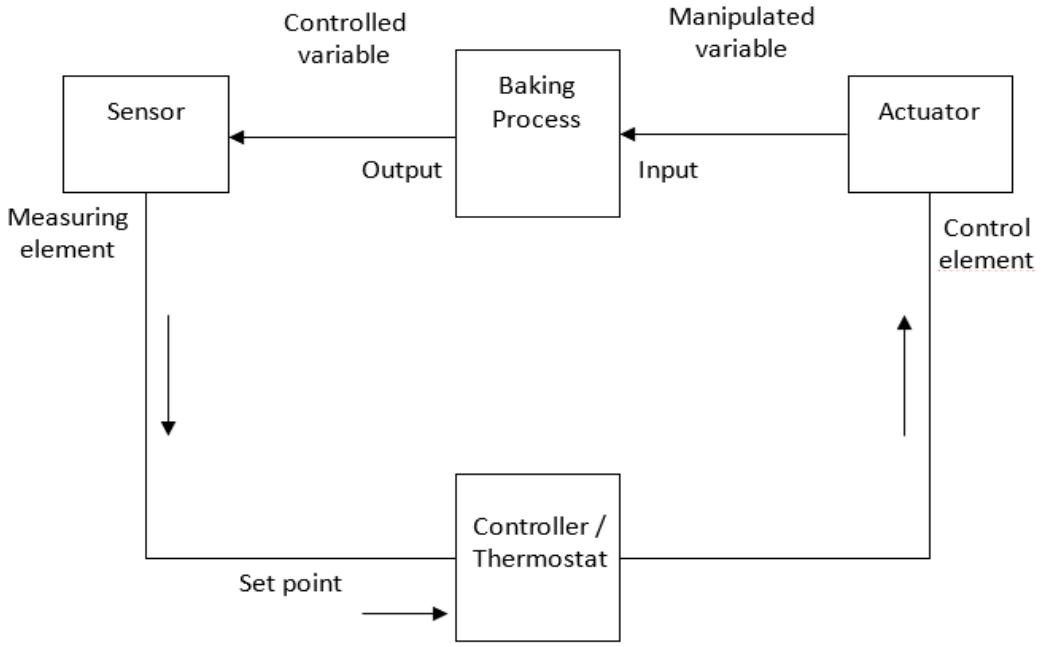


Figure 8 : Block diagram of the oven temperature control system

Table 4:variations in equipment operation

Malfunction	Possible cause	Remedial action
Abormal noise from the machine	There is a foreign object in	Remove the object
	A mechanical component has worked loose	Secure the component
	The carrier chains have	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
	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	Replace the chain
	The drive motor has stopped	Check the wiring and replace the motor if it is defective
	The power supply cable is	Replace the damaged cable

The swing pans do not advance in the right	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 The UV lamp has burnt out	Remove anything that is blocking the air extractor, check the entire circuit then change the fuse 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
	The extractor's motor has stopped working	Replace the air extractor

Self-check 3	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions (3 points each)

1. write the equipment and process varations?
2. describe the equipment variations and corrective actions?

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

Note: Satisfactory rating 9 points	Unsatisfactory below 9 points

Information Sheet 4- Variations in equipment operation and reporting maintenance requirements

4.1 Variations in equipment operation

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.

4.2 Maintainance requriments of equipment

Maintenance allows for the plant machinery and equipment to run smoothly without downtime and postponement of production. It is an essential prerequisite program of a food processing company. Food processing equipment and machinery of bakeries, like those of all industrial plants, is susceptible to failure through breakdown and deterioration in performance owing to wear and tear with time. Equipment and machinery breakdowns usually result in the contamination of foods with foreign bodies from broken parts, potential microorganisms growing in harborage sites such as cracks, crevices and pockets, and lubricating fluids from, e.g., broken bearings. This is why equipment and machinery require regular and planned servicing and maintenance, which include:

- Inspection/Checking
- Replacement
- Lubrication
- Repair

4.2.1 Types of maintenance

- ✓ **Preventive maintenance**: Planned program of checks, services, and repairs designed to avert equipment failure or building deficiencies
- ✓ **Corrective maintenance**: Scheduled work to improve the quality or performance of malfunctioning or broken equipment and restore it to proper working condition
- ✓ **Unscheduled maintenance**: Reactive in nature, occurring immediately when a critical repair is needed, often during unpredicted breakdowns
- ✓ **Temporary repairs:** Short-term repairs that use a variety of approved temporary materials and that are replaced with a permanent repair as soon as possible

4.2.2 Regulatory compliance

Maintenance of a food plant's premises, machinery, and equipment is thoroughly addressed in 21 CFR Part 117 (Current Good Manufacturing Practice, Hazard Analysis, and Risk-based Preventive Controls for Human Food). The following are a few examples:

- ✓ All plant equipment and utensils used in manufacturing, processing, packing, or holding food must be so designed and of such material and workmanship as to be adequately cleanable, and must be adequately maintained to protect against contamination.
- ✓ Instruments and controls used for measuring, regulating, or recording temperatures, pH, acidity, water activity, or other conditions that control or prevent the growth of undesirable microorganisms in food must be accurate and precise and adequately maintained.
- ✓ Equipment, containers, and utensils used to convey, hold, or store raw materials and other ingredients, work-in-process, rework, or other food must be constructed, handled, and maintained in a manner that protects against contamination.

- ✓ Properly store equipment within the immediate vicinity of the plant that may constitute an attractant, breeding place, or harborage for pests.
- ✓ Grounds must be designed, constructed, and maintained so that they do not constitute a source of contamination in areas where food is exposed.
- ✓ Buildings, fixtures, and other physical facilities of the plant must be maintained in a clean and sanitary condition and must be kept in repair adequate to prevent food from becoming adulterated.
- ✓ Seams on food-contact surfaces must be smoothly bonded or maintained so as to minimize accumulation of food particles, dirt, and organic matter and thus minimize the opportunity for growth of microorganisms and allergen cross-contact.
- ✓ Holding, conveying, and manufacturing systems, including gravimetric, pneumatic, closed, and automated systems, must be of a design and construction that enables them to be maintained in an appropriate clean and sanitary condition.

4.2.3 Relevance

Maintenance of bakery equipment and machinery includes:

- ✓ Regular and planned inspection/checking (assessment of the equipment's overall condition and integrity, e.g., whether it is working properly)
- ✓ Replacement of worn, rusty, damaged, loose, flaking, and broken parts
- ✓ Lubrication of drives, motors, bearings, chains, etc.
- ✓ Welding, repair and/or adjustment of loose parts on equipment prone to vibration, chemical reaction, friction and/or fatigue.

Building components of a bakery that require maintenance are:

- Walls and windows
- Floors
- Ceilings
- Supports
- Walkways
- Ramps/Platforms
- Dock levellers
- Drains

Equipment (processing and ancillary), and machinery of a bakery that require maintenance are:

- Sieves/Screens
- Dough pumps/Augers
- Pipelines for liquids transport (e.g., process water, liquid sugar, CIP cycles)
- Conveyor bands
- Weighers and ingredient feeders
- Fermentation tanks
- Mixers/Kneaders (Planetary/Spirals)
- Molders/Dividers/Rounders
- Proofers
- Ovens
- Slicers (blades)
- Packaging lines

Table 5: maintainance requirement reporting format

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	

Self-check 4	Written test

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 are the causes to equipment variation?
2. Describe mentainance types?
3. Type the components of equipment needed maintainance?

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

Note: **Satisfactory rating 9 points**	**Unsatisfactory below 9 points**

Information Sheet 5- Identifying, rectifying and/or reporting out-of-specification product/process outcomes

5.1 Reporting out-of-specification product/process outcome

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.

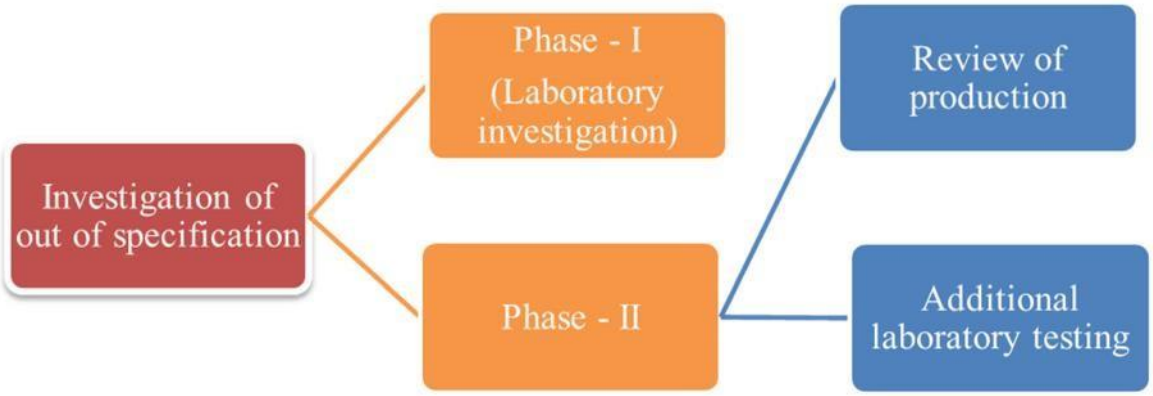


Figure 9: Investigation of OOS results

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.

Self-check 5	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. What is out of specification product?(4points)
2. How to identify out of specification products?(5points)

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

Note: **Satisfactory rating 9 points**	**Unsatisfactory below 9 points**

Information Sheet 6- Maintaining work area with housekeeping standards

6.1 Maintaining 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 regulatorycompliance. 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

Self-check 6	Written test

Name…… ID…… Date…….

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

Test 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**

Information Sheet 7- Conducting work with workplace information

7.1 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.

7.2 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.

7.3 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 standardThere are different types of technical or

engineering specifications and the term is used differently in different technical contexts. They often refer to particular 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 7	Written test

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. What are the work place informations?

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

Note: **Satisfactory rating 5 points**	**Unsatisfactory below 5 points**

Information Sheet 8- Environmental guidelines and legislative requirements

8.1 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.

8.2 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,

- 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

8.3 Work place requirments

• **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:

- ✓ 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
- ✓ Ilumination 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 8	Written test

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 legislative requirment ?
2. describe the work place requirments?

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

Note: **Satisfactory rating 9 points**	**Unsatisfactory below 9 points**

Information Sheet 9- Maintaining Workplace with work place recording requirements

9.1 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;

9.2 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.

9.3 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.

9.4 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:

- 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 9	Written test

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**

personal protective equipment's(PPE)

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

Purpose

Preparing good quality bakery products with the use of basic ingridents of bakeries and additional optional formulas. The baked product, usually made from wheat flour in a large variety of shapes, sizes, textures and flavours. They are produce, usually golden brown and with a different texture with standardized baked products such as bread, pastry,cake and biscuit.

Ingrident ratio

- 250g soft wheat flour
- 65g margarine
- 7g baking powder
- pinch of salt
- 1 egg
- 20g sugar
- 15g milk or water

1.1. Procedures of biscuit preparation

Step 1. Sieve the flour through a 1mm sieve to remove lumps and impurities.

Step 2. Mix the flour, margarine, baking powder and salt together either by hand or with an electric mixer.

Step 3. In a separate container mix the egg with sugar and milk or water.

Step 4. Add the liquid to the flour mixure and knead, either by hand or machine, to form a smooth dough.

Step 5. Roll out to about 5mm thickness using a rolling pin.

Step 6. Cut into the desired shape using a knife or shaped cutter.

Step 7. Bake at 200-250°C for 5 to 20 minutes until golden brown.

Step 8. Cool to room temperature on a wire rack. Pack in sealed plastic packets. Store in a cool dry place.

Ingrident ratio of bread

- Bread flour 100.0 gm
- Water 59.0–65.0ml
- Yeast 5g
- Sugar 6.0 g
- All-purpose shortening 3.0 g
- Salt, NaCl (chemically pure) 1.5 g
- Ascorbic acid (optional) 40–90 ppm

1.2. The procedures of bread baking

Step 1: Mixing

- ✓ Place dry ingredients in mixing bowl first, then add liquids. Avoid placing salt on top or next to yeast
- ✓ Mix to full gluten development. Record mixing time
- ✓ Time: depends on flour strength, quantity of functional polymers and mixing speed. Check final point by performing a gluten film test
- ✓ Final dough temperature: temperature of water should be adjusted to give dough out of mixer at 84 ± 1°F (29 ± 0.5°C)

Step 2: Bulk fermentation

- ✓ Time: fermentation time may vary from 60 to 180 min (90 min is recommended)
- ✓ Temperature: 82°F (28°C)
- ✓ RH: 85%
- ✓ Punching (degassing): punching or lamination of dough at 58, 86 and 100% of fermentation time

Step 3: Sheeting and moulding

- ✓ Sheeting and moulding can be performed by using a custom-made moulder or it can be carried out manually

Step 4: Panning

- ✓ Place the moulded dough pieces on baking pans previously greased

Step 5: Final proofing

- ✓ Record time: Proofing time may vary from 24 to 60 min (33 ± 2 min is recommended for optimum height)
- ✓ Set temperature: 82°F (28°C)
- ✓ Set RH: 85%

Step 6: Baking

- ✓ Time: 20–24 min (bake to an internal temperature of 204°F or 95°C
- ✓ Temperature: 419°F (215°C)

Ingrident ratio of cake

- Flour 100g
- Milk 30 ml
- 2 egg
- Butter 20g
- Vanilla 2 drops
- Salt 2g
- Baking soda 20g
- Sugar 70g
- Yeast 2g
- Oil 3ml

1.3. Procedures of cake making

Step 1.Pre-heat oven to 170°C

Step 2. Put all ingredients except the flour mix in a mixer bowl.

Step 3. Mix with a whip at high speed for around 4 minutes

Step 4. Stop mixer, add the flour mix and continue whipping at high speed for 4 more minutes.

Step 5. Pour the mixture into 2 English loaf cake moulds or a round cake mould (26 cm).

step 6. Bake at 170°C for 45-50 minutes.

Extra Cake options:

- Between stages 4 and 5 (after adding flour mix and before pouring into cake moulds), 250 gram of: Chocolate chips, Poppy seeds or any other type of nuts can be added

- For chocolate cake, Between stages 4 and 5 (after adding flour mix and before pouring into cake moulds), add 4 spoons of cocoa powder mixed in ¼ cup water (60 ml/gram) to the dough and mix for an additional 2 minutes at high speed.

Operation Sheet 2 - procedures of housekeeping standard

personal protective equipment's(PPE)

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

2.1. procedures of housekeeping standard

1. arrange the working 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.

Operation Sheet 3 - Methods of preparing and maintain work area and process machineries

Purpose: To effectively remove the foreign waste materials from the production environment as well as the processing machineries and to creat clean and tidy work environment.

3.1 Methods of preparing and maintain work area and process

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.

step9. Apply oil and grease to the required parts as part of routine maintenance

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

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

Task1. Apply wearing of personal protective equipment

Task2. Perform biscuit making procedure

Task3. Perform bread making procedures

Task4. Perform cake making procedures

Task 5: Perform preparing and maintain of work area and process

Task5. Perform house keeping standards

Task6. Perform maintaining work area

LG 53	LO- 3 Shut down the baking process

Instruction sheet
This learning guide is developed to provide you the necessary information regarding the following content coverage and topics: • Identifying shutdown procedure • Shut down the process as workplace procedures • Identifying and reporting the 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 as workplace procedures • Identify and report the 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.

Self-check 1	Written test

Name…… ID…… Date…….

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

Test I: Short Answer Questions

1.what is shut down procedure?

2.Write some of the precuations 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**

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**

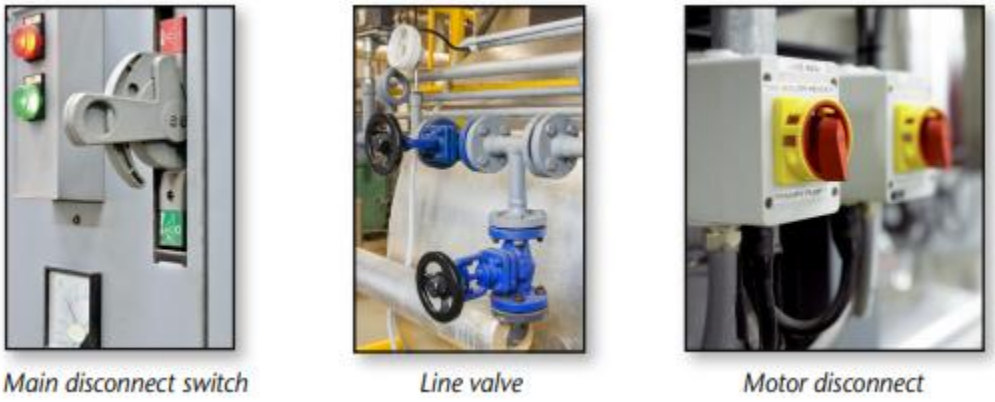
isolating devices Identify equipment in your workplace that needs service or maintenance. Determine the types of energy (there may be more than one) that powers the equipment, including potential energy that may remain when the energy sources are disconnected.

- **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, thiscould mean opening a manually operated circuit breaker.

Energy-isolating devices can be:

- ✓ 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

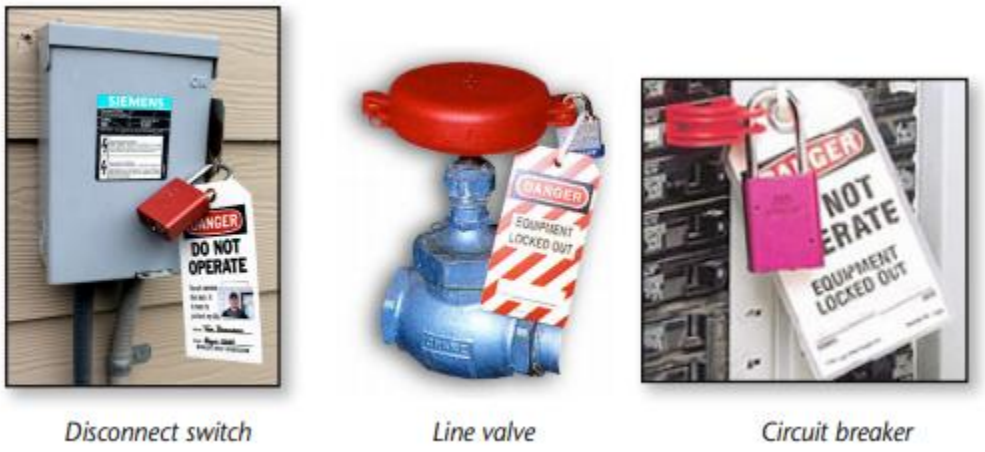
Figure 10: energy isolating device

- **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 accidently (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.



Disconnect switch Line valve Circuit breaker

Figure 11: 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

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 shoud consider during energy removing?
2. Write the shut down procedures?

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

Note: **Satisfactory rating 6 points**	**Unsatisfactory below 6 points**

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

Table 6: 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 7: preventive maintainance requirement format

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

Self-check 3	Written test

Name…… ID…… Date…….

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

Test I: Short Answer Questions (3 points each)

1. write the maintainance 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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