



# FOOD SAFETY MANAGEMNET SYSTEM (FSMS) GUIDANCE DOCUMENT



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Prepared by CII-HUL Initiative on Food Safety Sciences (CHIFSS)

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# ACKNOWLEDGEMENT

Food Safety is best achieved when all the stakeholders join hands and contribute in tandem for this noble cause. "Food Safety Management System (FSMS) for Bakery and Bakery Products" is one such initiative, which we believe will go long way in ensuring the bakery products, produced in India are manufactured with scientifically validated processes that ensures safety for the consumers.

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CHIFSS TEAM





# PREFACE

This Food Safety Management System (FSMS) for Bakery and Bakery Products is prepared with an intent to provide general guidance to manufacturers to ensure that critical food safety related aspects are addressed during the manufacturing process. This document mainly contains pragmatic approaches which a business can adopt during manufacturing of bakery products. However, manufacturers may adopt higher stringent levels, depending on the needs.

It is advised that anyone involved in manufacturing of Bakery products is trained appropriately to implement the measures and to demonstrate the behaviors mentioned in the document.

It is to be noted that this guidance document does not intend to replace any legal provisions required by law as applicable from time to time. Further, wherever the provision of this document conflicts with Schedule IV of (regulation 2.1.2) of Food Safety Standards (Licensing and Registration of Food Business Operators) Regulations 2011 or any other regulations, for that matter, the provision given in the regulations shall prevail.

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- Food Operations and Controls
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Processing		Record Title
Area		
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	2	Food Safety & Quality Objectives-Updated
	3	Management Review Meeting
	4	Internal Audit Plan
	5	Internal Audit Schedule
	6	Internal Audit Observation & Non-Compliance report
	7	FSMS Team members- Updated
	8	Product Information & Intended Use
	9	Process Flow Diagram and Control steps
	10	Hazard Analysis
	11	HACCP Plan
	12	HACCP Verification record
	13	HACCP Validation record
	14	Control of System Documents
	15	Valid FSSAI License
	16	Recall & Withdrawal record
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		riousekeeping record

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	52	Purchase Order
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	58	Preventive Maintenance record
	59	Pre-inspection record- Processing
	60	Fire extinguisher record
WAREHOUSE/ DISPATCH	61	Product Release record
	62	Outgoing Vehicle Inspection record

Records/ Documents should be available with the manufacturing facility.

# <u>รรส</u>์ ABBREVIATIONS



#### **CCP** Critical Control Point

**FSMS** Food Safety Management System

HACCP Hazard Analysis Critical Control Point

**QA** Quality Assurance

ACP Allergen Control Point

**ISO** International Organization for Standardization

**GMP** Good Manufacturing Practice

**GHP** Good Hygiene Practice

# <u>โรรส</u>์ DEFINITIONS



In order to provide guidance to the readers/ users, below key terms have been defined to interpret as desired by the document.

Act: The Food Safety and Standards Act, 2006

Regulation: The Food Safety and Standards Regulations, 2011

**Adulterant:** Any material which is or could be employed for making the food unsafe or sub-standard or mis-branded or containing extraneous matter.

**Baked goods:** Baked goods refers to process of cooking using dry heat, especially in oven. These are usually prepared from flour or meal derived from some form of grain.

**Best before:** the date which signifies the end of the period under any stated storage conditions during which the product shall remain fully marketable and shall retain any specific qualities for which tacit or express claims have been made. Beyond that date, the food may still be perfectly safe to consume, however, its quality may have diminished. However, the food shall not be sold if at any stage the product becomes unsafe.

**Biscuit**: It is a small baked unleavened cake, typically crisp, flat, and sweet. It is often confused with 'Cookie' which is more flat, small and sweetened and often added with nuts, etc.

**Bread**: It is a staple food prepared from a dough of flour and water, usually by baking.

**Cake:** Cake is a form of sweet dessert that is typically baked. Typical cake ingredients are flour, sugar, eggs, butter or oil, a liquid, and leavening agents, such as baking soda and/or baking powder.

**Cleaning:** The removal of soil, food residues, dirt, grease or other objectionable matter.

**Critical Control Point (CCP):** A step at which control can be applied (and is essential) to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

**Consumer:** persons and families purchasing and receiving food in order to meet their personal needs.

**Contamination:** Unintended ingress of microbial pathogens, chemicals, foreign bodies, spoilage agents, objectionable taints and unwanted matter, into the product and/ or process.

**Date of Manufacture:** the date on which the food becomes the product as described.

**Date of Packaging:** the date on which the food is placed in the immediate container in which it will be ultimately sold.

**Food:** any substance, whether processed, partially processed or unprocessed, which is intended for human consumption and includes primary food, genetically modified or engineered food or food containing such ingredients, infant food, packaged drinking water, alcoholic drink, chewing gum, and any substance, including water used into the food during its manufacture, preparation or treatment but does not include any animal feed, live animals unless they are prepared or processed for placing on the market for human consumption, plants, prior to harvesting, drugs and medicinal products, cosmetics, narcotic or psychotropic substances, provided that the Central Government may declare,





by notification in the Official Gazette, any other article as food for the purposes of this Act having regards to its use, nature, substance or quality.

**Food additive:** any substance not normally consumed as a food by itself or used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly), in it or its by-products becoming a component of or otherwise affecting the characteristics of such food but does not include "contaminants" or substances added to food for maintaining or improving nutritional qualities.

**Food business:** any undertaking, whether for profit or not and whether public or private, carrying out any of the activities related to any stage of manufacture, processing, packaging, storage, transportation, distribution of food, import an includes food services, catering services, sale of food or food ingredients.

**Food business operator:** a person by whom the business is carried on or owned and is responsible for ensuring the compliance of this Act, rules and regulations made there-under.

**Food safety**: assurance that food is acceptable for human consumption according to its intended use.

**Food Safety Management System:** the adoption Good Manufacturing Practices, Good Hygienic Practices, Hazard Analysis and Critical Control Point and such other practices as may be specified by regulation, for the food business.

**Hazard**: a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect to people or to the environment.

**Hazard Analysis Critical Control Point (HACCP):** A system that identifies evaluates and controls hazards, which significant for food safety.

**Ingredient:** any substance, including a food additive used in the manufacture or preparation of food and present in the final product, possibly in a modified form.

**Label:** any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed, graphic, perforated, stamped or impressed on or attached to container, cover, lid or crown of any food package and includes a product insert.

**Lot number" or "code number" or "batch number"** the number either in numerical or alphabets or in combination thereof, representing the lot number or code number or batch number, being preceded by the words "Lot No" or "Lot" or "code number" or "Code" or Batch No" or "Batch" or any other distinguishing prefix by which the food can be traced in manufacture and identified in distribution.

**Manufacture:** a process or adoption or any treatment for conversion of ingredients into an article of food, which includes any sub-process, incidental or ancillary to the manufacture of an article of food.

**Manufacturer- FSSA:** a person engaged in the business of manufacturing any article of food for sale and includes any person who obtains such article from another person and packs and labels it for sale or only labels it for such purposes.

Must: "To be implemented immediately, compulsory, mandatory"

**Package:** a pre-packed box, bottle, casket, tin, barrel, case, pouch, receptacle, sack, bag, wrapper or such other things in which an article of food is packed.





**Risk:** in relation to any article of food, means the probability of an adverse effect on the health of consumers of such food and the severity of that effect, consequential to a food hazard.

**Sanitation:** Also called Disinfection, is the reduction, by means of chemical agents and/ or physical methods, of the number of microorganisms to a level that does not compromise food safety or quality.

Should: "Strongly advised for current operations and may become mandatory in the future"

**Unsafe**: an article of food which is injurious to health:

- a) By the article, itself, or its package thereof, or
- b) Consists wholly or in part, any filthy, putrid, rotten, decomposed or diseased animal substance or vegetable substance; or
- c) Is processed unhygienically or the article of food has harmful substance in it or is infected or infested with worms, weevils or insects; or
- d) Has been substituted by inferior or cheaper substance whether wholly or in part; or
- e) uses a substance directly or as an ingredient or as additive which is not allowed under the law; or
- f) By virtue of its being prepared, packed or kept under unsanitary conditions; or
- g) By virtue of its being misbranded or sub-standard or food containing extraneous matter; or
- h) By virtue of containing pesticides and other contaminants in excess of quantities specified by regulations.





# SCOPE

This FSMS Guidance Document covers the manufacturer, storage and distribution of Bakery and bakery products. It deals primarily on Food safety science including related hazards and risks; and guidance on processing, storage, distribution to reduce the same.

# **INTRODUCTION OF BAKERY PRODUCTS**

Baking is the oldest cooking methods and the process is some thousand years old. There are various products that can be made through baking. The most common been: breads, biscuits, cakes, muffins, buns, pizza base, pies, tarts, crackers, brownies, cupcakes, and the list goes on.

In this document, we will mainly discuss on **BREADS**, **BISCUITS** and **CAKES**. The major ingredients in all the three baked products remains same with addition of other ingredients and method of preparation.

Flour	Is the major ingredient in making bread. It provides the structural framework 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.

Common Baked Ingredients and Their Functions:

Some Bakery products that contribute to Healthier Life style and thus they have varying addition of food ingredients:

a) Whole wheat bakery products





- b) Multigrain bakery products
- c) High fiber bakery products
- d) Sugar free bakery products (Saccharine or Aspartame or Acesulfame Potassium or Sucralose)
- e) Organic bakery products

# MANUFACTURING/ PROCESSING PARAMETERS FOR BAKERY PRODUCTS

#### 1. Manufacturing/ Processing Parameters

- **1.1 Manufacturing Flow Diagram** 
  - a. Biscuit Manufacturing Flow diagram:







b. Bread Manufacturing Flow Diagram:



#### c. <u>Cake Manufacturing Flow Diagram:</u>



Figure 1: General Manufacturing Flow chart

#### 1.2 PROCUREMENT, STORAGE AND HANDLING OF RAW OIL SEED

#### a) Eggs

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- i) Ensure that egg shells are not cracked upon receipt. Discard cracked eggs.
- ii) Store eggs in the chiller until they are needed. If you need to store eggs at room temperature, use the current batch of eggs and replenish the stocks daily.
- iii) Wash hands, utensils and surfaces thoroughly with sanitizing solution and water after handling eggs and before any contact with other food to prevent cross-contamination.
- iv) If you are breaking eggs for future use (also known as 'pooling'), pool the number of eggs you require just before use.
- v) Prepare raw eggs away from other food, especially cooked/ready-to-eat food to avoid crosscontamination.
- vi) Wash or clean all eggs before use to avoid any food cross-contamination.

#### b) Dry ingredients like wheat flour, sugar and cocoa powder

- Conduct a visual inspection during procurement to ensure the raw materials received are free from foreign material such as stone, glass, hair, jute thread, etc. This can be done by appropriate test sieves.
- ii) Raw material should be stored in a room that has the required humidity and temperature and the store room should be away from non-food materials to prevent cross-contamination.
- c) Ready-to-eat products containing lightly-cooked or uncooked eggs (e.g. mayonnaise, cream, icing, mousse, butter)
  - i) Prepare only what is required in small batches. Estimate the demand to avoid overproduction and prolonged storage.
  - ii) Use liquid egg or egg powder instead of shell eggs where possible.
  - iii) Observe good personal hygiene practices when preparing/handling the ready to- eat products.
  - iv) Store the finished products in covered containers in the chiller at 4°C and below. Ensure they are stored on separate shelves above raw food (including shell eggs).
  - v) Take out what is necessary from the chiller in small batches. Minimise the time products that are left out of the chiller. Store the products in the chiller as soon as possible after use.

#### 1.3 RAW MATERIAL STORAGE – REFRIGERATED AND NON-REFRIGERATED

- a) All raw materials should be
  - i) Stored off the floor and off the walls to ensure easy and adequate cleaning.
  - ii) Free from insect and rodent infestation or adulteration
  - iii) Free of contamination from other sources, e.g. birds, moisture, mould etc.
- b) Refrigerated items like chocolate, eggs should be stored at proper temperatures.
- c) If bulk floor handling and storage is in use then,
  - i) Hose couplings, inside and outside plant, should be adequately protected from rodents, clean and in good repair
  - ii) Dust collectors or ventilation bags at top of the bulk tank should be clean and insect free
  - iii) If system contains inspection ports, they should be cleanable/covered and free from contamination
  - iv) Tailings from sifting operations should be free from contamination.
- d) Periodic fumigation to be ensured.
  - i) Method of fumigation should be approved (like use of Aluminium phosphite which is an approved fumigant).
    - ii) Fumigation is recommended to practice minimum Once in a year.
    - iii) Should be carried by an approved third party which is expert and experienced.
    - iv) Post fumigation, the area should be inspected and verified for non- presence of any fumigant residue.
- e) All containers for storing raw materials are to be kept covered.
- f) FIFO (First In First Out) system should be applied to release the raw material from the store
- g) Expired material should be discarded and not enter into the manufacturing process.
- h) Food colours and additives should be used within the safe limits prescribed in FSS Act 2006.





### 1.4 MANUFACTURING

- a) 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.
- b) All the equipments and their surroundings should be free from dirt, dust and evidence of rodent or insect activity
- c) All equipments should have smooth edge and devoid of spot welding and any paint flakes.
- d) Inspection cleaning ports on flour conveyor systems should be accessible and easy to open.
- e) Conveyor systems should be free from pest activity
- f) Proofing equipment should be free from evidence of insects or rodents
- g) Temperature and humidity of proofing equipment, ovens and cooling area should be maintained
- h) Baking pans or storage bins should be clean
- i) Equipments should be cleaned before use
- j) Utensils like spoons, beaters, pans, bowls, trays, spatulas etc. should be clean and free from adulterants
- k) Utensils and equipment washing facilities should be clean and adequate and should be kept in a designated place.
- I) Cleaning agents and compounds should be labelled properly and kept separate from food items to prevent cross-contamination
- m) Weighing practices should be accurate to ensure the declared quantity of contents would be achieved.
- n) 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.
- o) 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.
- p) 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.

#### A. Working practices for reducing flour dust

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

#### B. Technical measures for reducing flour dust

Mixing space:	<ul> <li>Closed system in flour delivery and in dough production.</li> <li>Regular cleaning of the dust filter in the case of the cyclone and exclusive use of original filters</li> <li>Sufficiently long cloth or fabric hose for the flour delivery, and maintenance of it.</li> </ul>
Work equipment:	<ul> <li>Dust protection lid on the kneading machines instead of grilles (if the diameter of the kneader is larger than 510 mm)</li> <li>The use of automatic flour sprinklers for the individual machines; set them correctly and carry out regular maintenance.</li> <li>The exhaust air from the motors of the bakery machines must not be led over the flour containers.</li> <li>Access guards in roll or bread plants, through closed components or corresponding grilles (closed coverings or cladding are preferable to</li> </ul>
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	grilles, on account of the better protection they offer against dust).
Technical ventilation plan for reducing hazardous substances	<ul> <li>grilles, on account of the better protection they offer against dust).</li> <li>The technical ventilation measures are restricted to dust extraction and vapour traps.</li> <li>Depending on the quantity (volume flow) of the extracted air, mechanical provision of incoming air is necessary.</li> <li>Minimum requirements made of the ventilation plant: <ol> <li>Vapour traps over bakery ovens and fat-frying devices</li> <li>Spot flour dust extraction in the case of bread tin dusting and in the case of individual processing machines that produce large amounts of dust.</li> <li>Mechanical supply of incoming air</li> <li>Mechanical extraction of general waste air (if necessary)</li> <li>free flowing ventilation openings capable of being regulated</li> </ol> </li> </ul>
	<ul> <li>vi. The nowing ventilation openings not capable of being regulated, due to production circumstances (gates at despatch</li> <li>vii. Sugar grinding system should be equipped with proper dust collection system to avoid any fire hazard.</li> </ul>

Table 1: Technical measures for reducing flour dust

#### C. Premixing

- i) Flour should be sieved through minimum 32 mesh and the sieve should be cleaned regularly
- ii) If weevils are found, such consignments should be rejected.
- iii) 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.
- iv) (Good Practices; such as vacuum cleaning, collection of debris through hypochlorite can be used)
- v) Sugar to be passed through magnetic grill before use and periodic cleaning of magnetic grill to be ensured.
- vi) Sugar bags to be free from any external contamination like dust, dirt, rice bran, etc.
- vii) Egg trays to should be free from dirt or pests
- viii) Broken egg- shells to be stored in plastic bags and disposed off at regular intervals.
- ix) Fruit cuts to be washed with ozonized water before use.
- x) Potassium sorbate to be dissolved thoroughly in water before use. Only freshly prepared sorbate solution to be used.

#### D. Mixing

- i) Mixing room should be clean & dry without any spillage
- ii) All mixing utensils should be free from grease and old batter. This is ensured by using washing before use.
- iii) Mixing bowls, beaters and scrappers to be washed with hot water at least once in 24 hours
- iv) 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.
- v) Mixing room floor to be cleaned with hot water followed by mopping with hypochlorite solution

#### E. Air Handling Unit

- i) 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.
- ii) 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.
- iii) Additionally the air is passed through Hepa filter for pre-slab room.
- iv) 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.
- v) Hepa filter is changed when the same is choked or non-functional.





### F. Baking

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

## G. Cooling

#### a) Room temperature cooling of cakes at ambient room

- i) This room should be clean & dry and mopping of floor to be done with 500ppm hypochlorite solution at least once in each shift
- ii) After baking, bar cakes are to be transferred immediately to the ambient room
- iii) Positive pressure at ambient room is to be maintained
- iv) Ozonizer at this room is to be maintained at 2gms per hour level
- v) UV lights to be always put on during cooling of cakes. Personnel entry is to be restricted in this room
- vi) Workmen unloading cakes should use a disinfectant solution to disinfectant their hands.

#### b) Forced cooling at slab cooling room

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

#### 1.5 PACKAGING AND STORAGE OF FINISHED PRODUCT

- a) 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.
- b) Packaging material should also be kept and stored under hygienic conditions in a room intended for the purpose.
- c) All the products should be labelled according to the Food Labelling Act.
- d) Immediately after packaging and proper labelling, the products should be placed in the rooms provided for storage under required temperature and humidity conditions.
- e) Temperature and relative humidity of the storage area should be maintained to optimum required level.
- f) FIFO system should be applied for dispatch of all products.
- g) Temperature of cake slabs at the time of packing out from the Slab cooling room should be within the range of 14 190C
- h) Packing room temperature is to be maintained at 22-24 deg Centigrade
- i) Packers handling naked cakes to use sterilized gloves. Disinfectant solutions to be used by all packers as and when required
- j) Slicer blades & conveyor belts to be sterilized with isopropyl alcohol at least 3 times in each shift or as & when required
- k) Contact parts of packing machines to be cleaned with 500 ppm hypochlorite solution
- I) Exposure of UV light on PVC trays, cakes & wrappers to be done during packing
- m) Metal Detectors to be checked with probes before every start of the packing machine
- n) 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.

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*Figure 4: Hygienic Layout of Equipments & Packing materials Source: Mondelez* 

#### 1.6 SLICING/PACKING OF BREAD AND CONFECTIONARY PRODUCTS

- a) Cool baked products on clean racks and trays. As far as possible, the baked products should be covered during cooling.
- b) Clear crumbles that are left after slicing the products.
- c) Use clean packaging to pack the products.
- d) 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.
- e) Finished products must confirm to FSSAI Regulations.

#### 1.7 DESPATCH AND LOADING

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

#### 1.8 <u>RETAIL AND DISPLAY</u>

- a) Ensure that products are stored in clean display cases which are covered at all times.
- b) Ensure products are stored at appropriate temperatures (e.g. cakes with fresh cream should be stored in chiller display units at 4°C and below).
- c) 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.
- d) A time stamp is to be used for the products to inform consumers on the "consume-by" date.





#### 2. <u>Loading/ Unloading, Transportation, Retail Precautions related to Food Safety &</u> <u>Quality</u>

#### 2.1 CONTROL OF STORAGE CONDITIONS

- a) Specifications for Warehousing & Storage shall be used to describe the conditions required.
- b) 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.

#### 2.2 CONTROL OF TRANSPORTATION CONDITIONS

- a) 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.
- b) Assembly & Dispatch: Documented procedures defining shipping parameters for all stages of the distribution process shall be in place.
- c) Procedures for reporting stock or delivery issues (e.g. shortages, delayed deliveries) shall be taken into consideration.
- d) Transportation: Vehicles must be clean, free from odours, and be fitted with appropriate temperature control and monitoring devices where required.





# **PRE- REQUISITE PROGRAMS**

## 1. LOCATION AND SURROUNDINGS

Building and surrounding areas shall be designed, constructed and shall be maintained in a manner to prevent conditions which may result in contamination of food. '**Premises'** includes all the elements of building and building surroundings.

#### **1.1 Premises**

- a) Premises include all the elements of building and building surroundings.
- b) Building and surrounding area shall be designed, constructed and shall be maintained in a manner to prevent conditions which may result in contamination of food.
- c) Food Establishment shall be located away from environmentally polluted areas and industrial activities which produce disagreeable or obnoxious odour, fumes, excessive soot, dust, smoke, chemical or biological emissions and pollutants, and which pose a serious threat of contaminating food; areas subject to flooding; areas prone to infestations of pests; and areas where wastes, either solid or liquid, cannot be removed effectively.

The premise should not be used for residential purpose, nor shall it has or capable of having direct access to any residential area.



Figure 5: External boundary wall to prevent un-authorized entry and entry of pets/ animals, etc. Source: ITC

#### 1.2 Surrounding area

- a) The land outside the factory building shall be maintained free of debris and refuse, and free from any source of pollution.
- b) The roadways shall be maintained properly so that they do not contribute to contamination by dust or permit any stagnation of water.
- c) The premises, raw material receiving and finished product dispatch areas shall be maintained so that they do not contribute to contamination of food by seepage/foot-born filth or provide a breading place for pests.
- d) The drainage system shall be properly maintained to avoid any stagnation of water.
- e) The garden and the surrounding areas shall be maintained to prevent harbourage or breeding place for pests.







Figure 6: Restriction of access to water/ oil storage tanks installed outside the plant – to avoid bio terrorism Source: ITC

# 2. LAYOUT AND DESIGN OF FOOD ESTABLISHMENT PREMISES

- 2.1 The **building** shall be of sound construction and shall be maintained in good repair so that it does not pose any chemical, microbiological or physical hazards to the food.
- 2.2 Provide **sufficient space** for such placement of equipment and storage of materials as is necessary for the maintenance of sanitary operations.
- 2.3 Properly **storing** equipment, removing litter and waste, and cutting weeds or grass within the immediate vicinity of the plant buildings or structures that may constitute an attractant, breeding place, or harbourage for pests.
- 2.4 Maintaining **roads, yards, and parking lots** so that they do not constitute a source of contamination in areas where food is exposed.
- 2.5 Adequately **draining areas** that may contribute to contamination to food by seepage, footborne filth, or providing a breeding place for pests.
- 2.6 Operating systems for **waste treatment and disposal** so that they do not constitute a source of contamination in areas where food is exposed.
- 2.7 The **layout** of the food establishment shall be such that food preparation / manufacturing process are not subject to cross-contamination from viz. receiving, pre-processing (viz. packaging, dishing / portioning of ready-to-eat food). To prevent cross contamination, the activities shall be totally compartmentalized and strict measures should be taken to see that material movement happens only in one direction without any backward flow and any mixing up of various activities. Area occupied by machinery shall not be more than 50% of the manufacturing area.
- 2.8 The **floor** of food processing / food service area shall be made of impervious, non-absorbent, washable and non-toxic materials. Floor surfaces shall remain dry and maintained in a sound condition so that they are easy to clean and where necessary, disinfect. Floors shall be sloped appropriately to facilitate adequate drainage and the drainage shall flow in a direction opposite to the direction of food preparation / manufacturing process flow. The openings of the drains to be thoroughly covered with wire mesh to prevent insects and rodents from entering the processing area.
- 2.9 The **walls** shall be made of impervious, non-absorbent, washable and non-toxic materials and require a smooth surface easy to clean up to a height appropriate for the operations and wherever necessary, disinfect.



*Figure 6.1: Wall and pillar guards used to avoid daily wear and tear of the surfaces* Source: Mondelez

2.10 **Ceilings and overhead fixtures** shall be designed, constructed, finished and maintained so as to minimize the accumulation of dirt, condensation and growth of undesirable moulds and shedding of paint or plaster particles. Sufficient number of windows and exhaust openings shall be provided to minimize accumulation of dirt.



Figure 7: Water seepage / leakage in the walls / ceilings Source: ITC



*Figure 8: Provision of wall guards to avoid frequent damages and subsequent foreign matter contamination Source: ITC* 



Figure 9: No paint peel off Source: ITC

- 2.11 **Windows, doors & all other openings** to outside environment shall be well screened with wire-mesh or insect-proof screen as applicable to protect the premise from fly and other insects / pests / animals & the doors be fitted with automatic closing springs. The mesh or the screen should be type which can be easily removed for cleaning.
- 2.12 **Doors** shall be made of smooth and non-absorbent surfaces so that they are easy to clean and wherever necessary, disinfect.
- 2.13 In case of any **civil work during production**, adequate protection shall be taken to avoid sand / stone contamination.
- 2.14 The **exhaust fans** shall be provided with flaps on outer side and the other openings shall be adequately covered with screens to avoid entry of birds and pests and the same shall be maintained.
- 2.15 **Light fittings**, just above the process area, shall having shatter-proof protective covers to avoid the glass, dust or insects from contaminating the food.
- 2.16 Permit the taking of **proper precautions** to reduce the potential for food contamination, foodcontact surfaces, or food-packaging materials; and to protect food in outdoor bulk fermentation vessels.

## 3. EQUIPMENT & CONTAINERS

- 3.1 Equipment and containers that come in contact with food and used for food handling, storage, preparation, processing, packaging and serving shall be made of corrosion free materials, which do not impart any toxicity to the food material.
- 3.2 Equipment and utensils used in the preparation of food shall be appropriately labelled, kept at all times in good order and repair and in a clean and sanitary condition, and shall not be used for any other purpose.
- 3.3 Every utensil or container containing any food or ingredient of food intended for sale shall at all times be either provided with a proper fitting cover/lid or with a clean gauze net or other material of texture sufficiently fine to protect the food completely from dust, dirt and flies and other insects.
- 3.4 No utensil or container used for the manufacture or preparation of or containing any food or ingredient of food intended for sale shall be kept in any place in which such utensil or container is likely by reason of impure air or dust or any offensive, noxious or deleterious gas or substance or any noxious or injurious emanations, exhalation, or effluvium, to be contaminated and thereby render the food noxious.
- 3.5 Equipment shall be such located, designed and fabricated so that it permits necessary maintenance and cleaning functions as per its intended use and facilitates good hygiene practices inside the premise including monitoring and audit.





- 3.6 Appropriate facilities for the cleaning and disinfecting of equipments and instruments especially cleaning in place (CIP) system to be adopted.
- 3.7 All equipments especially containers for waste, by-products and inedible or dangerous substances, shall be specifically identifiable and suitably constructed.



Figure 10: Etching on containers for identification to ensure recipe Source: ITC

- 3.8 Containers used to hold cleaning chemicals and other dangerous substances shall be identified and stored separately to prevent malicious or accidental contamination of food.
- 3.9 If required, an adequate waste water disposal system / effluent treatment plant shall be put in place as approved by State Pollution Control Board.
- 3.10 All items, fittings and equipment that touch or come in contact to food must be:
  - Kept in good condition in a way that enables them to be kept clean and wherever necessary, to be disinfected
  - Chipped enamelled containers shall not be used. Stainless /aluminium / glass containers, mugs, jugs, trays etc. suitable for cooking and storing shall be used. Brass utensils shall be frequently provided with in lining
- 3.11 Seams on food-contact surfaces shall be smoothly bonded or maintained so as to minimize accumulation of food particles, dirt, and organic matter.
- 3.12 Equipment that is in manufacturing area and that does not come into contact with food shall be so constructed that it can be kept in a clean condition.
- 3.13 Holding, conveying, and manufacturing systems shall be of design and construction that enables them to be maintained in sanitary condition.
- 3.14 Each freezer used to store and hold food capable of supporting growth of microorganisms shall be fitted with an indicating temperature recording device.
- 3.15 Instruments and controls shall be accurate and adequately maintained, and adequate in number for their designated uses.
- 3.16 Equipment cleaning and sanitizing facilities: Adequate facilities and means like hot / cold water shall be provided for cleaning and sanitizing equipment.







Figure 11: Damaged containers (source of foreign matter contaminations) should not be used inside process Source: ITC



Figure 12: Usage of appropriate food grade gaskets Source: ITC

4. FACILITIES: Water Supply, Cleaning utensils and equipment, Washing of Raw Materials, Ice and Steam, Drainage and Waste Disposal, Personnel Facilities and Toilets, Air Quality and Ventilation, Lighting, Electrical Panel

#### 4.1 Water supply

a) Potable water that meets the requirements as per IS 10500, with appropriate facilities for its storage, distribution should be used as an ingredient and also for food handling, washing, processing and cooking.







Figure 13: RO plant for water treatment to meet Potable water requirements Source: ITC

- b) Water storage tanks shall be cleaned periodically (such as once in 6 months) and records of the same shall be maintained in a register.
- c) Non-potable water can be used only for cooling of equipment, steam production, fire-fighting & refrigeration equipment.

#### 4.2 Cleaning utensils and equipment

- a) Adequate facilities for cleaning, disinfecting of utensils and equipments shall be provided.
- b) The facilities must have an adequate supply of potable hot and cold water.

#### 4.3 Washing of Raw Materials

- a) Adequate facilities for washing of raw food should be provided. All basins (or other facilities) for washing food items must have an adequate supply of hot and/or cold water that is potable.
- b) These facilities must be kept clean and, where necessary, disinfected.
- c) Sinks used for washing of raw foods shall be kept separate and should not be used for washing utensils or any other purposes.

#### 4.4 Ice and Steam

- a) Ice and steam used in direct contact with food shall be made from potable water and shall comply with requirements of Bureau of Indian Standards specifications (IS :4251-1967).
- b) Ice and steam shall be produced, handled and stored in such a manner that no contamination can happen.

#### 4.5 Drainage and Waste Disposal

- a) The disposal of sewage and effluents (solid, liquid and gas) shall be in conformity with requirements of Factory / Environment Pollution Control Board. Adequate drainage, waste disposal systems and facilities shall be provided and they shall be designed and constructed in such manner so that the risk of contaminating food or the potable water supply is eliminated.
- b) Waste (hazardous) storage shall be located in such that it does not contaminate the food process, storage areas, the environment inside and outside the food establishment and waste shall be kept in covered containers and shall not be allowed to accumulate in food handling, food storage, and other working areas.
- c) Periodic disposal of the refuse / waste be made compulsory. No waste shall be kept open inside the premise and shall not be discharged outside the premise, on the road or drainage system.







Figure 14: Provision of foot operated closed waste bins Source: ITC

- d) Proper care shall be taken while disposing plastic /metal / glass materials, bags, containers and others which are not environment friendly.
- e) Food waste and other waste materials shall be removed periodically from the place where food is being handled or cooked or manufactured to avoid building up. A refuse bin of adequate size with a pedal operated cover shall be provided in the premises for collection of waste material. This shall be emptied and washed daily with a disinfectant and dried before next use.

#### 4.6 Personnel Facilities and Toilets

- a) Personnel facilities shall include adequate means of proper washing and drying of hands before touching food materials including wash basins and a supply of hot and /or cold water as appropriate; separate lavatories, of appropriate hygienic design, for males and females separately; and adequate changing facilities for personnel and such facilities shall be suitably located so that they do not open directly into food processing, handling or storage areas.
- b) The hand washing stations shall be provided with potable water, liquid soap dispenser, hand drying facilities and other self-drying sanitizers.
- c) Number of toilets depends on the number of employees (male /female) in the establishment and they should be made aware of the cleanliness requirement while handling food. Prescribed ratio of Toilets against number of employees is 1:25.
- d) Rest and refreshments rooms shall be separate from food process and service areas and these areas shall not lead directly to food production, service and storage areas.
- e) A display board mentioning do's & don'ts for the workers shall be put up inside a prominent place in the premise in English or in local language for everyone's understanding.

#### 4.7 Air Quality and Ventilation

Ventilation systems natural and /or mechanical including air filters, exhaust fans, wherever required, shall be designed and constructed so that air does not flow from contaminated areas to clean areas.

#### 4.8 Lighting

a) Adequate natural or artificial lighting should be provided to carry out operations in a hygienic manner.







Figure 15: Adequate lighting inside the process sections Source: ITC

- b) All light fixtures must be covered with shatterproof protective covers to avoid contamination of food due to breakages.
- c) **Safety lighting** is required for the bakery and the escape routes. Storage areas and social areas should be equipped with escape route orientation lighting.



Figure 16: Tube lights should have covers Source: ITC



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#### *Figure 17: Installation of street light along the boundary- to prevent fly attraction towards plant in the night Source: ITC*

SIZE OF BAKING AREA/PASTRY SHOP	MINIMUM REQUIREMENT OF LIGHTING
For existing businesses without spatial separation of the bakery and the pastry/cake shop	200 Lux
If the mixing space, baking room and the workplace for decorating baked	Mixing space: at least 300 Lux
goods are separate	Baking room: at least 200 Lux
	Work area for decoration:
	at least 500 Lux.
If only the bakery and the pastry/cake shop are spatially	Bakery: at least 300 Lux
separated	Pastry/cake department with decorating
	Workplaces: at least 500 Lux
If there is no spatial separation of the individual work areas	At least 300 Lux for the whole bakery

Table 2: Light requirements in Baking area/Pastry shop

#### 4.9 Electrical Panel

- a) 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.
- b) The electrical panels should have rubber mats/shockproof paint flooring below to prevent from any electric shock to any employee working at the station.



Figure 17: Electrical panels/ boards should be covered Source: ITC

- 5. FOOD OPERATIONS AND CONTROLS: Procurement of Raw Materials, Precautions on Food Ingredients, Storage of Raw Materials and Food, Food Processing (Time and Temp Control, Preparation), Food Packaging, Food Distribution/ Service
- 5.1 Procurement of Raw Materials and Food ingredients 33 | Page Private and Confidential





- a) All raw materials and food ingredients should be procured from approved suppliers and must conform to FSSA Regulations.
- b) COA/COC should accompany each received consignment.
- c) No raw material or ingredient thereof shall be accepted by an establishment if it is known to contain parasites, undesirable micro-organisms, pesticides, veterinary drugs or toxic items, decomposed or extraneous substances which would not be reduced to an acceptable level by normal sorting and/or processing.
- d) All raw materials, food additives and ingredients, wherever applicable, shall conform to the Regulations and regulations laid down under the Act.
- e) Records of raw materials, food additives and ingredients as well as their source of procurement shall be maintained in a register for inspection.
- f) Raw materials should be purchased in quantities that correspond to storage/ preservation capacity
- g) Packaged raw material must be checked for 'expiry date'/ 'best before'/ 'use by' date, packaging integrity and storage conditions.
- h) Receiving temperature of potentially high risk food should be at or below 5 0C
- i) Receiving temperature of frozen food should be -18 0C or below.
- j) Records of raw materials, food additives and ingredients as well as their source of procurement should be maintained for inspection. The invoices of purchase should be kept for traceability purpose.

#### 5.2 Storage of Raw Materials, Food ingredients, Food additives and Packaging materials

a) All raw materials, food ingredients, food additives and packaging materials to be kept 6" off the floor and 18" off the wall; to enhance easy and adequate maintenance and cleaning and also to avoid any pest harbourage.





Figure 18: Raw material should be stored on pallets Source: ITC



*Figure 19: Stand for keeping batch cards for identification and traceability of raw materials Source: ITC* 

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- b) Pallets to be cleaned at regular intervals to keep them free of cobweb, dust, dirt etc. and also to be inspected regular any repair/ replacement, if required.
   Best Practice is to avoid wooden pallets and to use plastic pallets. In case wooden pallets are used, care should be taken to a) Carry fumigation every 6 months; b) Periodic cleaning, inspection and maintenance c) Record keeping
- c) Wrappers & Trays, before going to Production, are to be kept under fumigation and ozonization.
- d) All wrapper rolls to be shrink-wrapped.
- e) Proper segregation shall be provided for storage of non-food chemicals, raw, processed, rejected, recalled, returned and re-cycled materials in a separate designated area to avoid any possibility of cross contamination.
- f) All materials to be appropriately labelled for proper identification.
- g) Adopt a First-Expired First-Out (FEFO)/ First-In First-Out (FIFO) approach for all raw materials, ingredients, work-in—progress, processed/ cooked and packaged food products. Do not use materials beyond their expiry date.
- h) Store materials at appropriate temperatures. Monitor and record temperatures of the chiller and freezer daily.
- i) As far as possible, store raw materials away from ready-to eat ingredients; in a separate chiller.
- j) Always store ready-to-eat materials/ ingredients in covered containers above raw materials/ ingredients.
- k) All raw materials, food additives and ingredients shall be stored in separate areas from printed packaging materials, stationary, hardware and cleaning materials/ chemicals.

#### 5.3 Food Processing and Preparation

**Temperature control:** All microorganisms have a defined temperature range in which they grow, with a minimum, maximum, and optimum. An understanding of the interplay between time, temperature, and other intrinsic and extrinsic factors is crucial to selecting the proper storage conditions for a food product.

**Time control:** When considering growth rates of microbial pathogens, in addition to temperature, time is a critical consideration. Food producers or manufacturers address the concept of time as it relates to microbial growth when a product's shelf life is determined.

- a) The Food Business shall develop and maintain the systems to ensure that time and temperature is controlled effectively where it is critical to the safety and suitability of food. Such control shall include time and temperature of receiving, processing, cooking, cooling, storage, packaging, distribution and food service up to the consumer, as applicable.
- b) Whenever frozen food / raw materials are being used / handled / transported, proper care should be taken so that defrosted / thawed material shall not be stored back and after opening for future use.
- c) Such systems shall also specify tolerance limits for time and temperature variations and the records thereof shall be maintained in a register for inspection.
- d) Wherever cooking is done on open fire, proper outlets for smoke/steam etc. like chimney, exhaust fan etc. shall be provided.
   Steam should be clean, dry and free from boiler carryover; which depends on boiler operating pressure and loading, water treatment management and efficient distribution; which influence the

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Figure 20: Temperature zones for different bacterial activity

#### 5.4 Food Packaging

- a) Packaging materials shall provide adequate protection for all food products to prevent contamination, damage and shall accommodate required labelling as laid down under the FSS Act & the Regulations there under.
- b) Only Food grade packaging materials to be used. For packaging materials like aluminium plastic and tin, the standards to be followed are as mentioned under the FSS Regulations and rules framed there under.
- c) Packaging materials or gases where used, shall be non-toxic and shall not pose a threat to the safety and suitability of food under the specified conditions of storage and use.
- d) Packing material should be robust and secure enough to prevent spoilage and contamination during transit.

#### 5.5 Distribution and Service

- a) An appropriate supply chain needs to be incorporated in the system to minimize food spoilage during transportation Processed / packaged and / or ready-to-eat food shall be adequately protected during transportation and / or service.
- b) Temperatures and humidity which is necessary for sustaining food safety and quality shall be maintained. The conveyances and /or containers shall be designed, constructed and maintained in such that they can effectively maintain the requisite temperature, humidity, atmosphere and other conditions necessary to protect food Conveyances and / or containers used for transporting / serving foodstuffs shall be non toxic, kept clean and maintained in good condition in order to protect foodstuffs from any contamination.
- c) Receptacles in vehicles and / or containers shall not be used for transporting anything other than foodstuffs where this may result in contamination of foodstuffs. Where the same conveyance or container is used for transportation of different foods, or high risk foods such as fish, meat, poultry, eggs etc., effective cleaning and disinfections shall be carried out between loads to avoid the risk of cross- contamination. For bulk transport of food, containers and conveyances shall be designated and marked for food use only and be used only for that purpose.

## 6. MANAGEMENT AND SUPERVISION




- a. **Documented procedure**: A detailed Standard Operating Procedure (SOP) to be developed and implemented for all the necessary actions to be taken on food hazard; so, that the course of damage control would be faster.
- b. *Food safety trainings & skills*: All technical managers and supervisors should have appropriate qualifications, adequate knowledge, induction and refresher food safety trainings and skills on food hygiene principles and practices. This will enable them to:
  - ensure food safety and quality of its products,
  - judge food hazards,
  - take appropriate preventive and corrective action, and
  - to ensure effective monitoring and supervision.

### 7. FOOD TESTING FACILITIES

- a. A well-equipped, in-house laboratory for testing of food materials (raw materials, ingredients, packaging materials) and/ or finished product; for physical, microbiological and chemical analysis in accordance with the specification/standards laid down under the rules and regulations, shall be in place.
- b. The laboratory should be preferably inside the premise for regular/ periodic testing and whenever required. If there is no in house laboratory facility, then regular testing shall be done through an external NABL accredited laboratory outside, approved by FSSAI Regulation.

Refer to approved external laboratory list by FSSAI Regulation-http://www.fssai.gov.in/Lab.aspx

- c. Apart from daily regular analysis; in case of any suspicion or possible contamination, food materials / food shall be tested before dispatch from the factory.
- d. In case of complaints received and if so required, the company shall voluntarily do the testing either in the in-house laboratory or from a designated accredited lab outside.
- e. The laboratory staff must be competent and trained to understand and assess the quality control parameters during food sample testing.
- f. A separate space should be maintained for keeping the retention samples in the manufacturing plant.
- g. Signed test records conducted in the laboratory should be maintained.

# 8. AUDIT, DOCUMENTATION AND RECORDS

- a. A periodic audit of the whole system according to the SOP be done to find out any fault / gap in the GMP / GHP system.
- b. Appropriate records of food processing / preparation, production / cooking, storage, distribution, service, food quality, laboratory test results, cleaning and sanitation, pest control and product recall shall be kept and retained for a period of one year or the shelf-life of the product, whichever is more.

#### 9. VALIDATION PROCEDURES

- a. Laboratory, whenever using non-standard methods or a standard method beyond the stated limits of operation, is required to validate such test methods. *(The guidance document on Validation of Test Methods, NABL 212 may be referred).* These procedures should be clearly stated in the documented method so that the user can assess the suitability of the method for their particular needs.
- b. Validation of a method establishes, by systematic laboratory studies, that the performance characteristics of the method meet the specifications related to the intended use of the analytical results.
- c. These procedures should be clearly stated in the documented method so that the user can assess the suitability of the method for their particular needs.





**10. SANITATION AND MAINTENANCE OF ESTABLISHMENT PREMISES:** Cleaning and Maintenance, Pest Control Systems, Allergen Protocols applicable, Cross contamination

#### **10.1Cleaning and Maintenance**

- a) A cleaning and sanitation programme shall be drawn up and observed and the record thereof shall be properly maintained, which shall indicate specific areas to be cleaned; and cleaning frequency; cleaning procedure to be followed, including equipment and materials to be used for cleaning. Equipments used in manufacturing to be cleaned and sterilized after each use at the end of the day.
- b) Cleaning chemicals shall be handled and used carefully in accordance with the instructions of the manufacturer and shall be stored separately away from food materials, in clearly identified containers, to avoid any risk of contaminating food.



Figure 21: Dedicated chemical (cleaning/ pest control) storage room with provision of lock and key Source: ITC

c) Preventive maintenance of equipment, machinery, building and other facilities shall be carried out regularly as per the instructions of the manufacturer, to prevent any hazards from entering into the food while being processed or packed or served. Non-toxic, edible grade lubricants shall be used.



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#### Maintenance tools stored separately in designated and clean manner Source: Mondelez

- d) Clean and sanitize all equipment (e.g. oven, dough mixer and proofer), utensils and food preparation surfaces thoroughly with food grade cleaning agents, potable water and sanitizing solution.
- e) Clean-up after every step of the preparation process (i.e. mixing, proofing, baking, cooling etc.) to prevent cross-contamination.
- f) Conduct regular inspections and maintenance of equipment. Promptly repair or replace damaged equipment to prevent contamination; for example, sieves for sieve integrity.
- g) Practise good refuse management.
- h) Plan and follow a cleaning schedule.
- i) All cleaning equipments should be stored in an organized manner, appropriately in a separate designated place.





Figure 21: Floor should be in kept clean and tidy Source: ITC



*Figure 22: 5S system maintained or all cleaning materials* Source: Mondelez



*Figure 22: Cloths used for cleaning purposes should not have loose threads* Source: ITC

#### 10.2 Pest Control

- a) Holes, drains and other places where pests are likely to gain access should be kept in sealed condition or fitted with mesh, grills or claddings as required to prevent entry of pests.
- b) Food materials should be stored in pest-proof containers stacked above the ground and away from walls.
- c) Should have an effective pest control program.
- d) Treatment with permissible chemical, physical or biological agents, within the permissible limits, should be carried out without posing a threat to the safety or suitability of food. Records of pesticides / insecticides used along with dates and frequency should be maintained.
- e) Acceptable methods of controlling pests in food premises:
  - i) Prevent entry (nets, keep doors closed, etc.)
  - ii) Do not leave food waste or uncovered food laying around
  - iii) Use appropriate methods to trap pests; preferably rodent boxes in outside and glue traps inside the processing areas.
  - iv) Do not use poisonous materials inside the processing areas to trap pests.





Figure 23: Insecticutors should be "ON" Source: ITC







*Figure 24: Opaque PVC strip at entrance to avoid flies/ insect attraction inside the plant* Source: ITC

#### Pest Control 4Ds; mentioned as below:

- ✤ <u>1D Deny Entry- Preventing Entry</u>
- (a) Seal all holes, crevices at ceilings, walls and floors
- (b) Threshold clearances of doors < 6mm, fix metal kicking plates
- (c) Double door / air curtains / strip curtains / mesh screens, self-closing doors at appropriate locations Missing / damaged gratings of drains installed / replaced
- <u>2D Deny Shelter Elimination of Harbourage of Pests</u>
- (a) Avoid False sealing in Bakehouse and storage area
- (b) Repair defects on walls, floors, ceilings, woodwork & other structures
- (c) Remove disused / obsolete articles from food premises
- <u>3D Deny Food- Eliminate food sources to pests</u>
- (a) Store all foods and condiments in sealed / covered containers
- (b) Floor free from food remnants
- (c) Prohibit preparing food and utensils cleaning at other places
- (d) Store refuse in dedicated closed container and discard periodically to prevent accumulation.
- (e) Surface channels and gratings clean and clear of food remnants
- ✤ <u>4D Eradication of Pests</u>
- (a)Clean & disinfect pest infested places, clothing and equipment
- (b)Use Insectocuter Place 4.5 to 6 m away from food handling area
- (c)Use low wall mounted insectocutors
- (d)Clean insectocutor every week
- (e)Cover all foods during Pest control treatment
- (f) Use glue pads inside and rodent boxes outside the processing areas
- (g)Pest or chemical contaminated food be discarded.



*Figure 25: No gaps around apertures/ doors inside the plant* Source: ITC



Figure 26: No infestation/ flies/ insect inside the plant Source: ITC

#### **10.3 Allergen Control Management**

Any Allergen Control Plan should address the below minimum requirements:

- a) Listing of all allergen ingredients:
  - Paste all the allergens at the relevant places in the processing areas for awareness among all the employees. The allergens may include:
    - All that are used intentionally
    - that enter your site unintentionally (staff food, via contractors, transport, neighbours (air borne, etc.)
- b) Supplier monitoring
  - COAs should be obtained for all allergens from the approved suppliers.
  - When reviewing specifications, the responsible person should look for formulations of the listed ingredients of the raw material.
- c) Plant traffic flow
  - Maintain all ingredient flow during the manufacturing from non-allergen using areas to allergen using areas. This will help prevent cross-contamination.
- d) Raw material storage
  - All raw materials that are allergens should be labelled with a tag that states "allergen." The label can be made Bold and with Bright color for quick identification.
  - Store all allergic foods or ingredients to a designated and separate area. For partially used allergic packets, the production staff should ensure the partially used packet should be stored separately and completely sealed and identified with label.

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- Color-coding charts can also be placed throughout the production area, especially above all wall-mounted equipment and near storage areas for easy identification by plant personnel.
- e) Color coding system for allergen specific utensils
  - Dedicated scoops, utensils shall be used for specific allergens.
  - Bright colors and words can be used for easy identification of different allergens.
- f) Production scheduling and Cleaning
  - Thorough cleaning should be there between allergic containing product manufacture and non-allergic containing product manufacture. Process should be there to ensure any allergen residue on the production line.
  - Preferably products containing non-allergen ingredients should run before the product containing allergic ingredients.
  - When production scheduling and cleaning operations are not performed between allergen containing production runs, allergen testing must be performed. For. E.g. ELIZA test kits are used to verify.

#### **10.4 Cross-Contamination**

Proper precautions should be taken to reduce the potential for food contamination, food-contact surfaces, or food-packaging materials; and to protect food in outdoor bulk vehicles.

In case of any **civil work during production**, adequate protection shall be taken to avoid sand / stone contamination.

#### 11. PERSONAL HYGIENE: Health Status, Personal Cleanliness, Personal behavior, Visitors

#### 11.1 Health Status

- a) Personnel known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted through food causing food contamination, shall not be allowed to enter into any food handling area. The Food Business shall develop system, whereby any person so affected, shall immediately report illness or symptoms of illness to the management and medical examination of a food handler shall be carried out apart from the periodic checkups, if clinically or epidemiologically indicated.
- b) Additionally, arrangements shall be made to get the food handlers / employees of the establishment medically examined once in a year to ensure that they are free from any infectious, contagious and other communicable diseases. A record of these examinations signed by a registered medical practitioner shall be maintained for inspection purpose.
- c) The factory staff shall be compulsorily inoculated against the enteric group of diseases once a year and a record towards that shall be kept for inspection.
- d) In case of an epidemic, all workers to be vaccinated irrespective of the yearly vaccination.



Figure 27: Arrangement of periodic medical checkups and vaccinations in line with Schedule IV (FSSR 2011) for employees and food handlers Source: ITC

#### **11.2 Personal Cleanliness**

- a) Food handlers shall maintain a high degree of personal cleanliness. The food business shall provide to all food handlers with adequate and suitable clean protective clothing, head covering, face musk, gloves and footwear and the food business shall ensure that the food handlers at work wear only clean protective clothes, head covering and footwear every day.
- b) The personal protective equipment shall be worn in such an order to avoid any crosscontamination of dust/dirt, etc.; i.e. starting from head to foot. Head caps/headgears to worn first and foot wears to be worn at the last.



Figure 28: Proper apron to be used before entering into process hall. Hairs should not be long and covered properly Source: ITC



- c) Food handlers, with any cut or wounds, shall not be allowed to come in direct contact with food or food contact surfaces and shall be covered with waterproof dressing.
- d) Before entering the shop floor all persons should wash their hands with liquid soap and potable water followed sanitizing with self-drying sanitizing agent and drying hands through a hand drier. Food handlers shall always wash, disinfect and dry their hands at the beginning of food handling activities; immediately after using the toilet; and after handling raw food or any contaminated material, tools, equipment or work surface, coughing/sneezing, smoking; to avoid contamination of other food items.



*Figure 31: Touch free (hands free) taps at wash basins to avoid cross contamination* Source: ITC





Figure 32 to 36: Source ITC

e) Separate lockers/place should be provided to workers/supervisors who regularly work in food processing areas to keep their personal belongings, tiffins, etc.



Figure 37: Storage of personal hygiene clothing Source: Mondelez

#### **11.3 Personal behavior**

- a) Food handlers engaged in food handling activities shall refrain from smoking, spitting, chewing, sneezing or coughing over any food whether protected or unprotected and eating in food preparation and food service areas.
- b) The food handlers should trim their nails and hair periodically, do not encourage or practice unhygienic habits while handling food. Beards should be covered with nets/masks.
- c) No jewellery shall be allowed inside processing areas other than simple marriage bands.
- d) Persons working directly with and handling raw materials or food products shall maintain high standards of personal cleanliness at all times. In particular:
  - i) they shall not smoke, spit, eat or drink, chew gum/ tobacco in areas or rooms where raw materials and food products are handled or stored;
  - ii) wash their hands at least each time work is resumed and whenever contamination of their hands has occurred; e.g. after coughing / sneezing, visiting toilet, using telephone, smoking etc.
  - iii) avoid certain hand habits e.g. scratching nose, running finger through hair, rubbing eyes, ears and mouth, scratching beard, scratching parts of bodies etc.- that are potentially hazardous when associated with handling food products, and might lead to

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food contamination through the transfer of bacteria from the employee to product during its preparation. When unavoidable, hands should be effectively washed before resuming work after such actions.

e) Care should be taken not to wear the protective clothing, head covers, face masks, gloves and footwear outside the processing areas; and appropriate measures should be taken for the same.



*Figure 38: No usage of Gutkha/ tobacco inside the plant* Source: ITC

#### **11.4 Visitors**

- a) Proper care has to be taken to ensure that food safety and hygiene are not getting compromised due to visitors in the floor area.
- b) The Food Business shall ensure that visitors to its food manufacturing, cooking, preparation, storage or handling areas must wherever appropriate, wear protective clothing, footwear and adhere to all personal hygiene provisions as mentioned by the company to maintain food safety.







All packaged food products shall carry a label and requisite information shall be there as per provisions of Food Safety & Standards Act, 2006 and Regulations & Regulations made there under so as to ensure that adequate and accessible information is available to the next person in the food chain to enable them to handle, store, process, prepare and display the food products safely and correctly and that the lot or batch can be easily traced and recalled if necessary.

# 13.<u>TRAINING</u>

- a) All personnel who come in contact with the food need to be trained on food hygiene and safety.
- b) Trainings should be mandatory for personnel who are responsible for monitoring, corrections and corrective actions of the food safety management system, supervisors whose activities have an impact on food safety and internal auditors.
- c) Training need identification is done for all employees before training.
- d) Pre and Post- evaluation of training is identified which indicates the effectiveness of training done.
- e) Induction trainings (for new employees) & Refresher trainings (for existing employees) shall be conducted
- f) Yearly training calendar and schedule with all training topics should be prepared and communicated to all.
- g) All records shall be maintained for the same.

#### 14. REWORK and NON-CONFORMANCE MANAGEMENT

#### 14.1 Non-conformance

- a) A non-conformance could be identified through:
  - customer complaints,
  - internal audits,
  - external audits,
  - incoming material inspection
  - or simply during normal testing and inspection activities.
- b) All non- conformance incidents should be recorded and assessed.
- c) There should be a defined storage area and handling procedure for non-confirming raw material, packing material and finished goods.

#### 14.2 Rework management

- a) Rework shall be stored, handled and used in such a way that product safety, quality, traceability and regulatory compliance is maintained.
- b) Rework shall be clearly identified and/or labelled to allow traceability. Traceability records for rework shall be maintained.
- c) Rework is incorporated into a product as an 'in process step', the acceptable quality, type and conditions of rework use shall be specified.

#### 15. CUSTOMER COMPLAINTS HANDLING

An effective complaint handling system should comprise the following:

- a) Policy and complaints handling procedure
- b) Clear identification of all possible complaint sources
- c) Complaint capturing and categorizing based on the health and safety risk
- d) Investigation and root cause analysis (RCA)
- e) Corrective action





- f) Complaint trending and analysis
- g) Continual improvement

### 16.TRACEABILITY & RECALL MANAGEMENT

- a) A traceability system should be established and be capable of both forward and backward movement.
  - i. **Forward traceability** movement from raw material to stages in supply chain.
  - ii. **Backward traceability** movement from end of the supply chain to the source of raw materials.
- b) It also involves origin of food ingredients, processing history, definition of the batch, links between manufacturing batches, methods of production, methods of analysis, storage, personnel involved, the entire supply & distribution chain system, etc.
- c) A firm, either of its own through any other sources viz. wholesaler, distributer, retailer, exporter, importer, consumer, media etc., if is informed that any of its products is unsafe or deficient violating provisions of the act and rules, & regulations made there under, may initiate a recall.
- d) In such situations, the firm is required to submit a recall alert notification to local authority immediately but not later than 24 hours. To ensure speedy communication, such alert can be sent by Fax, E-mail, On-line and / or by Post.
- e) The Local authority will inform of such recall alerts to Food Authority within 24 hours of receipt.
- f) The traceability procedures should be tested **at least annually (Mock Recall)** to verify the effectiveness of recall process (rapidly identifying and removing product from the market).

#### Suggested Reading:

Product recall procedure shall be as per FSSAI recall protocol mentioned in Food Safety and Standards (Food Recall Procedure PART III Section 4) Regulations.

### 17.FOOD DEFENSE, BIOVIGILENCE and BIOTERRORISM

- a) Each establishment shall assess the hazard to products posed by potential acts of sabotage, vandalism or terrorism and shall put in place proportional protective measures.
- b) Access control:
  - i. Potentially sensitive areas within the establishment shall be identified, mapped and subjected to access control.
  - ii. Where feasible, access should be physically restricted by use of locks/restricted entries, electronic card key or alternative systems.
    - Water tanks shall be locked
    - All dead ends are to be capped
    - Entry should be restricted. Only authorised person should enter in manufacturing areas.





# HAZARDS ASSOCIATED WITH BAKERY PRODUCT MANUFACTURING & HACCP IMPLEMENTATION FOR IMPORTANT CONTROL MEASURES

Implementing Hazard Analysis and Critical Control Point (HACCP) is crucial for any food manufacturing process. A HACCP plan covers the total supply chain, from inbound logistics, through storage, processing, sanitation and maintenance to the final use by the consumer. Across the operations, it must be ensured that procedures are available for internal logistics, processing specifications, working instructions, hygiene procedures and preventive maintenance plans. These procedures must cover start-ups, shutdown and unexpected stoppages during processing.

In general, safety concerns, including all sorts of bakery products, also occurs when the food is minimally processed to achieve desirable texture and quality attribute; or when many ingredients are added after baking therefore chances of cross contamination is high from raw materials if not cleaned and stored properly.

Bakery groups according to pH							
High-acid bakery products	рН < 4.6	e.g. apple pie					
Low-acid bakery products	pH > 4.6 and < 7	e.g. whole wheat bread, white bread, chocolate nut bread					
Non-acid alkaline bakery products	n-acid alkaline bakery products pH>7 e.g. banana nut bread, muffins						

All potentially hazardous products have pH > 4.5 and aw > 0.84.

Bakery groups according to aw							
Low-moisture bakery products	aw < 0.6	e.g. cookies, crackers					
Intermediate-moisture bakery products	pH > 0.6 and < 0.84	e.g. doughnuts, pastries, cream filled cakes					
High moisture bakery products	pH> 0.84	e.g. breads, pies, custard cakes, pizza					

### **Brief Introduction of HACCP:**

Hazard Analysis Critical Control Point (HACCP) is essential to carry out to identify the weakness of the production line and to suggest critical limits in compliance with legislation and therefore the preventive and corrective measures.

Though HACCP system was designed to aim zero defect products, yet it is not feasible to achieve 100% defect free products. However, it sets a goal to minimize the associated risks during production and subsequently reduce unacceptable unsafe products.

During implementation of HACCP, it is imperative to set controls at each point of the production line at which safety problems (physical, chemical and microbiological) are likely to occur.

A HACCP plan is required to be in place before initiating the HACCP system. A HACCP plan consists of 5 initial steps and 7 major HACCP principles.





STEP 1	Assemble HACCP Team				
	<b>↓</b>				
STEP 2	Describe the product				
	<b></b>				
STEP 3	Document Intended Use of product				
	+				
STEP 4	Construct process Flow diagram				
STEP 5	Onsite Confirmation of Flow diagram				
	<b>↓</b>				
PRINCIPLE 1	Identify hazards (Conduct Hazard analysis)				
	↓				
PRINCIPLE 2	Identify CCPs (Critical Control Points)				
	•				
PRINCIPLE 3	Establish Critical Limits for each CCP				
	•				
PRINCIPLE 4	Establish Monitoring action				
	+				
PRINCIPLE 5	Establish Corrective action				
	•				
PRINCIPLE 6	Establish Verification process				
	+				
PRINCIPLE 7	Establish record- keeping procedures				

The requirements for Sanitation Standard Operating Procedures (SSOPs) along with Good Manufacturing Practices (GMPs) should be considered as Pre-Requisite for HACCP.

Implementing Hazard Analysis and Critical Control Point (HACCP) is crucial for any food manufacturing process. A HACCP plan covers the total supply chain, from inbound logistics, through storage, processing, sanitation and maintenance to the final use by the consumer. Across the operations, it must be ensured that procedures are available for internal logistics, processing specifications, working instructions, hygiene procedures and preventive maintenance plans. These procedures must cover start-ups, shutdown and unexpected stoppages during processing.

Risk assessment is a critical step in a HACCP plan. Below is a template to determine what severity and probability a processing step is involved with and therefore what level of criticality is holds in the processing line.

			Consequence/ Severity						
			Hov	w severe could th	<u>e outcome be if t</u>	<u>he risk event occ</u>	urs?		
			Severe	Severe Major Significant Minor		Minor	Insignificant		
p	curing2	Frequent	Extreme	Extreme	Very High	High	Medium		
kelihoc	e risk oc	Likely	Extreme	Very High	High	Medium	Medium		
lity/ Lil	nce of th	Occasional	Very High	High	Medium	Medium	Low		
robabi	s the cha	Seldom	High	Medium	Medium	Low	Very Low		
4	What's	Unlikely	Medium	Medium	Low	Very Low	Very Low		

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# **Microbiological Hazards**

#### Salmonella spp

Salmonella spp are destroyed in accelerated temperature conditions and remain viable under freezing and refrigerated conditions.

Eggs are the most common and obvious source of Salmonella in bakery products. Other ingredients which can cause Salmonella are flour, milk, cheese, butter, fruits, nuts, spices, which are used in any one or more bakery products. These causes Salmonellosis which is a common gastro-intestinal food borne illness.

#### **Control measures:**

Handling unclean and contaminated eggs can result in spreading contamination of work surfaces, hands and equipments. Therefore, through cleaning of eggs is required.

Also, the eggs should be used as soon as they are cracked; or the planning of a specified quantity of eggs should be developed such that there is no longer time wait between eggs cracking and using into processing.

Strict personal hygiene and good manufacturing practices are also critical.

#### Staphylococcus aureus

The common source of this microorganism is human nasal passages, throats and skin. It is also found everywhere in water, milk, sewage and on food contact surfaces. Although S. aureus is destroyed by heating, the enterotoxin still is active and not removed even under pasteurized conditions. Hence, food borne illnesses which caused by S. aureus may still occur even in the absence of viable cells. Mostly the bakery products are kept at ambient temperature in retails and sometimes they are held manually by staff and customers at self-serve areas. This increases highly the contamination potential of S. aureus and subsequently the growth and production of enterotoxin at ambient storage temperature.

#### **Control measures:**

Improved sanitation, temperature control, use of preservatives, Good Manufacturing Practices (GMPs) are some factors which can effectively reduce the level of contamination.

#### **Bacillus species**

Bacillus spp. Are found very commonly in soils, dust and water. Bacillus spores are found in flour, flour based products i.e. bakery and bakery environment. These spores are heat resistant and can grow to toxin production levels under favourable conditions.

#### **Control measures:**

Proper sanitation and testing of raw materials helps to reduce initial spore counts. The control of spore growth is difficult in the finished products, therefore, use of preservative can delay the germination.

#### Listeria Monocytogenes

This is widespread in soil, vegetation and water. It survives in aerobic, anaerobic and microaerophilic and also at elevated levels of CO2. It can also grow at low pH and aw conditions.

### Control measures:

Under the above conditions, the only way to prevent contamination and growth of this pathogen is to maintain strict hygiene and temperature condition.

#### **Mycotoxigenic Molds**

Molds, though are visibly seen and rejected by consumer, yet some mold secretes mycotoxins into the bakery products which causes major health concerns. **Control measures:** 





Proper storage of wheat flour to avoid moisture pick-up and moisture migration therefore prevent mold growth. Antimycotic agents like – propionates and sorbates greatly reduce the risk of mold growth and mycotoxin production in breads.

Regular air quality checks is also necessary for monitoring and hence controlling the high levels of microorganisms in the processing environment.

## **Chemical Hazards**

#### Grease

Vehicle grease can transfer from raw material packaging surfaces during transport. Grease may also transfer at metal detection station.

#### **Control measures:**

Vehicle inspection should be conducted regularly. Also control on cleanliness should be maintained from supplier's end.

#### **Chemical contamination**

Cross contamination of chemicals and raw materials / ingredients can occur in storage areas. Control measures:

Adequate physical separation should be maintained between other non-edible chemicals and food items. All possible measures should be developed and effectively implemented to avoid any chance of cross contamination.

#### **Food color**

High level of food colors in bakery products cause severe health effects including asthma, hyperactivity, etc. Control measures:

Food color concentration need to be controlled and approved levels shall be maintained.

#### Arsenic and heavy metals

Long term presence of arsenic in water and in products with water as an ingredient can cause cancer in skin, lungs, bladder and kidney. Also water that is used for cleaning and sanitation should be free of heavy metals.

**Control measures:** 

Periodic water testing is necessary for control and monitoring.

#### **Physical Hazards**

Some physical hazards and sources possible in bakery industry are from metals, thread hair, rice bran (from raw materials received in plastic containers and gunny bags and other processing areas); wood (raw materials received in liquid drums), unacceptable odor due to spoilage and fermentation (inappropriate storage of butter and other raw materials); dust and dirt (throughout processing areas).

Control measures Regular inspection plans, control and effective cleaning and maintenance





# **Allergen Hazards**

Food intolerance or Allergen may happen through Gluten, Eggs, Lactose, whipped dairy Cream. An extreme care is needed in cleaning and sanitation and prevention of cross contamination both within allergen– allergen ingredients and allergen– non-allergen ingredients, during manufacturing processes. A robust program need to be developed and implemented effectively on Cleaning & Sanitation, GMP, Personal hygiene, GHP, etc.

The above mentioned allergic causing ingredients are seldom replaced by few industries which wants to avoid the use of this allergen and hence saves efforts for prevention of cross contamination and subsequent hazards related to it. In this scenario of replacement, when new ingredients are added, care is needed to control related hazards to these ingredients. Thus, all the above – Physical, Chemical and Microbiological hazards need to be analysed with risk assessments and control measures to be specified and implemented, if applicable.

**Gluten** free baking includes challenge of replicating functionality of gluten in absence of wheat fibre use. Gluten intolerance/ celiac disease is a lifelong illness that is caused by sensitivity to gluten. Flour is thus replaced with combination of fine rice fibre, potato starch, tapioca fibre and xanthan gum.

Lactose, is a double sugar found in milk and similarly, is replaced by Soy milk.

**Whipped dairy cream** is replaced by combination of veg based cream filling. It is also replaced by soft or silken soybean curd in case of cheese cakes.

**Eggs** are used to give moisture content. The moisture content can be replaced with milk or other liquids. Commercial egg can be replaced by combination of potato starch, tapioca fibre, chemical leavener and carbohydrate gums. Lecithin can also be added which improves overall volume, texture and eating quality.

#### Control Measures:

Allergen Control Program (ACP) should include the following Control Measures in a bakery industry:

#### PEOPLE:

- > Employee awareness through product and utensil identification
- > Hand washing in between non-allergic and allergic materials
- > Clothing- change of clothes wore while handling allergen materials.
- Rework control- Utmost care to be taken to handle allergen materials to avoid any accidental cross-contamination.
- Waste control- Allergen material wastes should not be allowed to pile up or spill which can result in environment cross contamination.

#### **RAW MATERIALS & INGREDIENTS**:

- > Knowledge of ingredients from suppliers to avoid any possible cross-contamination.
- > Clear labelling and identification of all raw materials and ingredients
- > Safe transport from supplier to receiving place
- > Allergen items to store separately in food processing units. Avoid any spillage

#### PACKAGING:

- > Good and safe package integrity from supplier
- Correct labelling

#### **CLEANING**:

- > Effective cleaning to avoid risk of cross contamination
- Dedicated cleaning equipment
- > Cleaning schedule to be developed keeping in mind all the chances of cross contamination
- > Regular cleaning of spillages of allergen materials throughout processing





# **PRODUCTION**:

- Minimize movement of materials
  Scheduling of production runs with appropriate cleaning between the runs
  Physical barriers between allergen and non-allergen materials

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# **REFERENCES, SUGGESTED READINGS**

#### References

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- 17) http://www.engineerlive.com/content/22140
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#### Suggested Readings

- 1) Food Safety and Standards (Food Product Standards and Food Additives) Regulation, 2011
- 2) Food Safety and standards (Packaging and Labelling) Regulation, 2011.





# ANNEXURES

# Annexure 1

#### Specific Regulatory requirements for Biscuit:

As per Sub regulation 2.4 of Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011

• Biscuits including wafer biscuits shall be made from maida, vanaspati or refined edible oil or table butter or desi butter or margarine or ghee or their mixture containing any one or more of the following ingredients, namely:

Edible common salt, butter, milk powder, cereals and their products, cheese cocoa, coffee extract, edible desiccated coconut, dextrose, fruit and fruits products, dry fruit and nuts, egg, edible vegetable products, ginger, gluten groundnut flour, milk and milk products, honey, liquid glucose, malt products, edible oilseeds, flour and meals, spices and condiments, edible starches such as potato starch and edible flours, sugar and sugar products, invert sugar, jaggery, protein concentrates, oligofructose (max 15%) vinegar and other nutrients and vitamins:

- Provided that it may contain permitted food additives
- Provided further that it may contain artificial sweetener with label declaration
- Provided also that it shall conform to following standards, namely:

(i)	ash insoluble in dilute hydrochloric acid (on dry basis):	shall not be more than 0.1 per cent
(ii)	acidity of extracted fat (as oleic acid):-	not exceeding 1.5 per cent

It may contain Oligofructose (dietary fibres) upto 15% maximum subject to label declaration under Regulation 2.4.5 (43) of Food Safety and Standards (Packaging and Labeling) Regulations, 2011.

#### Specific Regulatory requirements for Bread:

- BREAD whether sold as white bread or wheat bread or fancy or fruity bread or bun or masala bread or milk bread or of any other name, shall mean the product prepared from a mixture of wheat atta, maida, water, salt, yeast or other fermentive medium containing one or more of the following ingredients, namely:—
- Condensed milk, milk powder (whole or skimmed), whey, curd, gluten, sugar, gur or jaggery, khandsari, honey, liquid glucose, malt products, edible starches and flour, edible groundnut flour, edible soya flour, protein concentrates and isolates, vanaspati, margarine or refined edible oil of suitable type or butter or ghee or their mixture, albumin, lime water, lysine, vitamins, spices and condiments or their extracts, fruit and fruit product (Candied and crystallized or glazed), nuts, nut products, oligofructose (max 15%) and vinegar:
- Provided that it may also contain permitted food additives.
- Provided further that it may also contain permitted artificial sweetener with label declaration .
- Provided also that it shall conform to the following standards, namely:-





(a)	alcoholic acidity (with 90 per cent alcohol)	Shall be not more than equivalent of 7.5 ml. N NaOH per 100 g of dried substances.
(b)	ash insoluble in dilute HCL on dry weight	Not more than 0.1 per cent
	basis: (i) bread except masala bread or fruit	Not more than 0.2 per cent
	bread (ii) masala bread or fruit bread	

- Provided also that it shall be free from dirt, insect and insect fragments, larvae, rodent hairs and added colouring matter except any permitted food colours present as a carryover colour in raw material used in products.
- It may contain Oligofructose (dietary fibres) upto 15% maximum subject to label declaration under labelling regulation 2.4.5 (43) of Food Safety and Standards (Packaging and Labelling) Regulations, 2011.





# Annexure 2

#### Sterilization of Critical areas of Cake units:

#### 1) By Ozone gas through diffusers (During Production)

- It is used for rapid inactivation of microorganisms and bacterial spores, by oxidation of sulphydryl groups which are abundant in microbial enzymes.
- Ozone is a triatomic allotrope of oxygen, colorless gas with acrid odour (heavier than water) & an oxidizing agent.
- OSHA Standards for Ozone concentration: For air sterilisation of rooms: 0.1 ppm maximum for Human safety.
- It leaves no hazardous residues on food or food-contact surfaces.

#### 2) By Fumigation

- Sterilisation by gases and vapours: For irradication of Microorganisms. When NO Production (in the absence of man)
- Rooms are fumigated with formaldehyde gas by treating with potassium permanganate (once a week or when there is no production)

#### 3) Alcohols (70%) for Machines

Cause the proteins of bacteria to denature and coagulate.

#### Ways of Reducing Microbial Spoilage in cake plant

- AHU (air handling units) with pre filters & HEPA filtration systems for the processing areas
- UV lights in critical areas / packing machines
- Ozonizers
- Preservatives Plays a major role in preventing growth of microorganisms
- Personnel Hygiene of people During handling & packing
- Use of disposable sterilised / gamma irradiated gloves
- Overall hygiene of the factory





# Annexure 3

#### Packaging and Labelling Requirements:

The below packaging and labelling requirements are specific for bakery and bakery products. For all general requirements; please refer to "Food Safety and standards (Packaging and Labelling) regulation, 2011".

- 2. The food, in which hydrogenated vegetable fats or bakery shortening is used shall declare on the label that 'hydrogenated vegetable fats or bakery shortening used- contains trans fats.
- 3. Every container of refined salseed fat shall bear the following label, namely,

#### 'REFINED SALSEED FAT FOR USE IN BAKERY AND CONFECTIONERY ONLY'

- 4. Every package of Bakery and Industrial Margarine made from more than 30 per cent of Rice Bran Oil shall bear the following label, namely,— This package of Bakery & Industrial Margarine is made from more than 30 per cent of Rice Bran Oil by Wt.
- 5. In case of package or bottle containing sterilised or Ultra High Temperature treated milk, soya milk, flavoured milk, any package containing bread, dhokla, bhelpuri, pizza, doughnuts, khoa, paneer, or any uncanned package of fruits, vegetable, meat, fish or any other like commodity, the declaration be made as follows :—

#### "BEST BEFORE ......DATE/MONTH/YEAR" OR "BEST BEFORE......DAYS FROM PACKAGING" OR

#### "BEST BEFORE ...... DAYS FROM MANUFACTURE"

Note: (a) blanks be filled up (b) Month and year may be used in numerals (c) Year may be given in two digits

6. Every package of biscuits, bread and cakes containing Oligofructose shall bear the following declaration, namely,–

#### Contains Oligofructose (dietary fiber) ---- gm/100 gm

7. Provided that for Ingredients falling in the respective classes, the following class titles may be used, namely

#### Class: Cakes Class Title: Cocoa solids (if used)





# **Annexure 4**

## **FSMS Related Document & Record Templates**

# Food Safety & Quality Policy (Template)

Top management has defined a food safety policy (as mentioned below) which:

• Is appropriate to the role of the organization in the food chain,

• Conforms with statutory and regulatory requirements and with mutually agreed food safety requirements of the customers,

• Addresses communication,

• Is supported by measurable objectives (as mentioned below),

• Has been communicated, implemented and explained to the all employees of the organization. Food safety policy posters printed in English and Hindi are displayed at all important locations in the organization. FSTL conducts survey periodically to assess the level of understanding of the policy amongst employees, and

• Shall be reviewed for continuing suitability once in a year.

As an illustrative example below:

<u>(Company name)</u> is committed to exceed expectation and need of its esteemed guests and ensure to provide them with safe and quality food and beverage as well as prompt and efficient service.

The organization shall achieve above commitments through:

• Providing vibrant work environment that result in excellence.

• Establishing and reviewing food safety objectives for continual improvement in skills of the employees, processes and systems.

• Meeting requirements of customers as well as applicable statutory and regulatory requirements.

• Applying ISO 22000 principles in food safety management system that results in production of quality and safe food and beverage from receiving to serving the guest.

# Food Safety & Quality Objective (Template)

Every Objective should be SMART:

S- SPECIFIC; M-MEASURABLE; A-ATTAINABLE/ ACTION ORIENTED; R-REALISTIC; T-TIME BASED

As an illustrative example below:

S.No.	Objective	Target
1	To ensure that all employees are trained in food hygiene during the year.	Improvement by 2%
2	Increase in customer satisfaction index	Improvement by min. 1%
3	Reduction in numbers of unsatisfactory & rejected grades - C & D grades of food items from receiving to serving through validation & verification of all process CCPs & OPRPs by conducting microbiological testing.	Improvement by 2%





# Management Review Meeting (Template)

#### Name of Manufacturing plant: Date:

Attendees:

Name	Designation/Ar ea of Operation	Signature

S.No.	Review Topics	Discussion / Comments	Further Actions	Responsibility	Target date
1	Follow up actions from previous MRM (incl. Corrective & Preventive actions)				
2	Analysis of results of verification activities				
3	Changing circumstances that can affect food safety				
4	Emergency situations, accidents, reacall or withdrawls				
5	Reviewing result of system updating activities				
6	Review on communication activities, incl. customer feedback				
8	Results of Internal Quality Audits (incl. HACCP), external audits and inspection				
9	Supplier performances				
10	Reports on process & service non- conformance				
11	Assurance of food safety				
12	Performance objective of Processes & products for improving FS effectiveness				
13	New opportunities for improvement/ Resource requirements				
14	Review of Food Safety & Quality Objective and Policy				
15	Others				





# Internal Audit Plan (Template)

C No	Drosocs Area				N	lonth/Y	ear:						
5.110.	FIDCESS AIEd	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Store areas- Raw material, ingredients, chemicals, finished product												
2	Process Area												
3	Housekeeping, Cleaning & Personal Hygiene												
4	Preventive Maintenance												
5	Internal Laboratory												
6	Management functions												
7	Packaging & Dispatch area												
8	Documentation												
9	Human Resource & Training												
10	Others												

# Internal Audit Schedule (Template)

Date of Audit:

Standard of Audit:

S.No.	Process Area	Auditee(s) & Functional Department	Auditor(s) & Functional Department	Date	Time
1	Store areas- Raw material, ingredients, chemicals, finished product				
2	Production/Manufacturing Area				
3	Housekeeping, Cleaning & Personal Hygiene				
4	Preventive Maintenance				
5	Internal Laboratory				
6	Management functions				
7	Packaging & Dispatch area				
8	Documentation				

ſss	ai			
9	Human Resource & Training			
10	Others			
rnal	 Audit Observation & No	on- conforma	ance repor	rt (Template)

Name of Manufacturing plant: Date of Internal Audit: Process Area Audited: Auditor(s): Auditee(s):

Areas Covered:

S.No.	Observation area	Compliance checkpoint	Status (Yes/No)	Non-Compliance details (if any in this area)	Corrective action planned	Responsibility	Traget date of completion	Actual completed on

### FSMS Team (Template)

S.No.	Name	Designation	Funtional Area	Qualification	Experience/Skills	FSMS Training done on	Responsibility

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# Product Information (Template)

S.No.	Description	Specifications
1	Product Category/Name	
2	Composition (Raw materials, Ingredients, etc.)	
3	General & Specific product specification	
4	Legislative requirements, Customer requirements	
5	Storage	
6	Labeling	
7	Transportation	
8	Product Shelf-life	
9	Packaging material	
10	Hazardous for any group of customers	
11	Food Category	
12	INTENDED USE	

# Control of System Documents (Template)

S.No.	Document No.	Document Title	Issue/ Revision no.	Issue/Revised Date of document	Reason for Revision	Request Done by	Request Approved by	Funtional Area responsible/ Location

# Product Recall record (Template)





S.No.	Date of Complaint	Nature of Complaint	Results of Investigation	Product / Batches & quantity recalled	Mode of Disposal

Product Identification & Traceability (Template)





Traceability D	etail Format
----------------	--------------

**Product Description** Plant Name: Product Name: Pack Size:

#### Traceability Details Investigation Date:

InvestigationTime Start:

Manufacturing Date: Manufacturing Time: Batch/Lot no.:

InvestigationTime End: Total Time Taken:

#### A. CIP Details

		CIP Details		
Equipment Name	Date	Time	Person	Remarks
			responsible	

#### **B.Ingredient Details**

Mater	Material Description				
Name	Batch/Lot No.	Remarks			

#### C. Water Treatment Details

Chemical/Material De	Romarks	
Name	Batch/Lot No.	Remarks

#### D. Primary Packaging

Material Description				
Batch/Lot No.	Remarks			
	cription Batch/Lot No.			

#### E.Manufacturing Details

Date	Shift	Cases	CCP Compliance	Remarks
		Manufactured		

#### F. Analytical Details

Date	Shift	Analytical	Product	Remarks
		compliance%	blocked,if any	

# G.Dispatch Details

energe atten betans				
Invoice No.	Date of	Quanity	Dispatch	Remarks
	Dispatch	Dispatched=	Destination	
		Total produced-		
		(Rejected+		
		Control samples+		
		Warehouse		
		retained)		

# Product Recall- Mock Drill report (Template)

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Date of Drill: Starting Time of Drill: Closing Time of Drill: Overall Time taken: Product name: Area Covered: Mode of communication used (Telephone/ Fax / e-mail):

#### Persons/Parties contacted:

S.No.	Service Point	Location	Name of person contacted	Telephone/ Fax / e-mail	Quantity of product lying in stock

**Result of Physical Verification:** 

Remarks:

# **Correction & Corrective Action report**

Processing Area: Date: Inspected/Audited By: Processing area incharge:

Non-conformance Observed					
Root cau	ise analysis				
Correction Proposed	Corrective Action Proposed				
Correction Proposed	Corrective Action Proposed				
Target Date:	Target Date:				
Correction Review	Corrective Action Review				
Date	Date:				
Dept. Incharge	Dept. Incharge				





# Customer/ Consumer Complaint Log (Template)

Complaint Number:					
Date:		Time recorded:		am	pm
Quality related:		Food safety related:			
Customer Details					
Customer Name:					
Phone:					
Address:			City:		-
State/Province: _			Zip code:		-
Email: _					
Product Consumed					
Product name:					
Batch Code/Lot no.:					
Package size:					
Location purchased:					
Date of purchase:			Date consumed:		-
How was the product s	tored?				-
Nature of Complaint					
Foreign object		Off/ Unsatisfactory F	lavor 📃	Allergic	
Packaging		Illness		Others	
How many people cons	sumed?			Ages?	
Symptoms/Additional	Problem Informa	ition:			
Has the Customer					
Seen a Doctor?			Gone to Hospital?	)	
Spoken to a public hea	lth?		Contacted Regula	tory Agency?	
Comments & follow up	action				
Feedback from client-	Status or date fin	alized			





# **Determination of Customer Satisfaction (Template)**

We would like to know how well we are succeeding in meeting your needs. Following is the questionnaire about what you wanted from us. Answers will be treated with complete confidentiality. Please answer these questions using the scale (Please TICK that you choose).

('1' being the worst score; '5' being the best score)

S.No	QUESTIONS	SCORE					
1	How well do we communicate with you?	1	2	3	4	5	
2	Do we give you the information you need?	1	2	3	4	5	
3	Do we answer your queries promptly?	1	2	3	4	5	
4	Do we respond positively to your problems & suggestions?	1	2	3	4	5	
5	Do you feel we have a concern for quality & food safety?	1	2	3	4	5	
6	Do we deliver quality & safe products consistently and on time?	1	2	3	4	5	
7	Do we anticipate your needs?	1	2	3	4	5	
8	Have we increased your understanding of quality & food safety?	1	2	3	4	5	
9	Do we work with you as a team?	1	2	3	4	5	

Any other comments?

Name and Address

# Training Calendar (Template)

S No	Topic of training		Month/Year:										
5.110.	TOPIC OF LEARNING	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													





# **Training Need Identification (Template)**

Name of employee:	Date of Joining:
Qualification:	
Designation:	Department:
Key Responsibilities:	

#### Training(s) Required

1	Managerial	
2	Technical	
3	On the Job	
4	General/Others	

Suggested Training iinstitutions (applicable for external trainings):

Any other suggestions:

Signatue of Dept. Head:

Below topics of training to be determined, but not limited to:

- 1 Food safety policy
- 2 Food safety objective and targets
- 3 Actual or potential significant environmental impacts and unacceptable risks of the work activities
- 4 Food Safety and hygiene related issues
- 5 Compliance to legal requirements
- 6 Roles and responsibilities of employees to ensure effective implementation of food safety
- 7 Operational Control procedures
- 8 Emergency Preparedness and response requirements
- 9 Potential effects of deviation from documented procedures





# Training Record (Template)

Date of Training: Conducted By: Subject of Training: Brief summary of the subject: Duration of Training:

S.No.	Name of person trained	Functional area	Remarks	Signature
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

# Training Effectiveness record (Template)

Date of Training: Subject of Training: Brief summary of the subject:

S.No.	Name of person	Functional area	Pre-evaluation	Post-evaluation	Effectiveness	Comment on	Signature of
	trained		result	result	status (Yes/NO)	effectiveness	trainee
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Effectivess can be based on: Improvement in quality of work, Improvement in work output, Behavioural change, Overall usefulness of training, etc.
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## Visitor Record (Template)

Date of visit:	
Time of entry:	
Time of exit:	
Name of visitor:	
From (location):	
Whom to meet:	
Purpose of visit:	
Type of visitor:	Please Tick:
	Type I (Critical areas: Internal processing areas)
	Type II (Outside processing areas)
	Type III (Office areas)
Any Allergy/ Infectious disease	
declaration:	
Belongings description:	
Signature of visitor:	
Signature of Security in-charge:	
Signature of person visited:	

NB: Pls adhere to all the food safety and quality ; and company policies and rules during your visit





## Pre-employment medical record (Template)

Name of Candidate:
Father's name:
Address:
Date of Birth:
Designation applied For:
Age:
Name of hospital/laboratory tested:

#### **Medical Examination**

Heart	:	Blood Group :
Chest	:	Blood Sugar :
Abdomen	:	Haemoglobin :
Blood Pressure	<u>·</u>	T.L.C. :
Eye Sight	:	D.L.C.: P
C.N.S.	:	L
		М
		E
X.Ray Chest:		Urine Examination:
E.C.G.:		Stool:

Final Medical Report:	
Sugnature of Candidate	Signature of Medical Examiner:
	Reg. No. of the Medical Examiner:

## Regular medical record (Template)





Name of employee:	
Date of medical test conducted:	
Next Medical test due on:	
Name of hospital/laboratory tested:	
Tests done for:	
Status of accceptance (Yes/No):	

# Monitoring of personnel hygiene (Template)

Date:

S.No.	Employee Code	Employee name	Area of work	Hand wash, sanitize (and Gloves where necessar y)	Clean & trimmed Nails	No open Wounds	No Jewellery	Covered Hair	Clean outer garments / protectiv e clothing	Clean Shoes/ shoe covers	Infectiou sDisease / Skin infection / Allergy, if any	No Tobacco/ Smoking / Chewing	Overall Hygiene Status upon examina tion (Yes/No)	Action needed on non- complian ce	Re- examina tion status (Yes/No)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10						6									
11															
12															
13															
14															

Jewelllery wrist watches, cufflinks, ear rings, glass bangles, stick bindis





## Non-conforming Material/Product (Template)

HOLD:	REJECT:		
Material Type:			
Finished Product		Raw Material	
In-Process Product		Packaging Material	
Material Name:			
Date of Manufacturin	ng/Receipt:		
Quantity of Manufac	turing/Receipt:		
Lot/Batch No.			
Quantity used:			
Lot/Batch No.			
Quantity Hold:			
Lot/Batch No.			
Quantity Rejected:			
Lot/Batch No.			
Reason for Hold:			
Reason for Rejection	::		
Corrective Action:			
Preventive Action:			
Remarks:			
Signature:			
QC Executive	Qualiity I	Manager	Mfg. Manager





## Glass & Brittle Plastic Monitoring record (Template)

S.No.	Item number	Item placed at	Condition (OK/Not OK)	Correction done	Remarks

## Knife/ Other Utensil Monitoring record (Template)

S.No.	Item	Item placed at	Condition	Correction	Remarks
	number		(OK/Not OK)	done	

## **Operation Log Sheet (Template for Temperature Control)**

S.No.	Date	Time	Temp. Gauge Number	Specification / Range allowed	Actual Result	Remarks	Sign





#### Equipment Breakdown Maintenance report (Template)

Date:

Period of Report:

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

### List of Monitoring & Measuring Devices and Records of Calibration (Template)

S.No.	Name of Equipment	ID.No.	Location	Range	Least Count	Frequency of Calibration	In house calibration Done On	In house calibration Due On	Remarks	Sign

# Pest Management Plan (Template)

Type of Pest	Mode of Control	Station (locations) monitored	Number designated	Frequency of Monitoring	Remarks

### Pest Monitoring record (Template)





Date	Type of Pest	Mode of Control	Station (locations)	Number designated	Frequency of	Clean (ok/Not ok)	Remarks	Sign
			monitored		Monitoring			

# Waste Disposal Record (Template)

	Amount of waste							
S.No.	Chemica/	Food	Package	Other	Other	% of total	disposal	
	Hazardous	material	material	waste	waste	waste	(Yes/No)	
	waste	waste	waste	(Dry)	(Wet)			

## Approved Supplier List -Latest (Template)

	Itom/Matorial	Location	Primary Appro	ved Supplier	(Name & d	omplete a	address)	Secondary A	Approved Supp	olier (Nam	e & comp	lete
S.No.	Namo	of Lico	Complete	Contact	Contact	Emailid	[ av	Complete	Contact	Contact	Emailid	[ av
	Name	orose	Address	Person	No.	Етпанта	Tux	Address	Person	No.	Emaina	Fux





# **Incoming Material Inspection**

*Includes all type: Raw materials, Ingredients, Food addiitives, Processing aids, Packaging materials, Cleaning and sanitation chemiclas, etc.* 

Material Name:	
Supplier Name:	
Identification/Location of Supplier:	
Quanity received:	
Pack size received:	
Material Receipt Date:	
Transport Mode:	
Rejected (Yes/No):	
Reason for Rejection:	

PARAMETER EVALUATED	STATUS/RESULTS	Signature
Temperature (Degree Celsius)		
Visual Inspection Condition (OK/Not OK)		
Packaging & Labelling Condition (OK/Not OK)		
Production Date/Shelf Life Date/Expiry Date		
Vehicle Inspection Condition (OK/Not OK)		
Quality Lab Results (If applicable)		
Certificate Of Analysis (COA) received (Yes/No)		
Remarks		
Clearannce Date		
Authorized Signatore		





## Incoming Vehicle Inspection Record (Template)

Date of Incoming Vehicle: Vehicle Type: Material in Vehicle received: Number of Persons accompanying Driver:

PARAMETER EVALUATED	REMARKS
Security lock	
Type of carrier (full covered/ Open Roof)	
Mode of covering products (in case of Open Roof)	
Overall Hygiene in the interior	
Overall Hygiene on the exterior	
Any sharp edges / points in the interior of vehicle	
Any pests detected	
Any grease /oil detected	

Authorized Singature

## List of Monitoring & Measuring Devices And Records of Calibration (Template)

S.No.	Name of Equipment	ID.No.	Location	Range	Least Count	Frequency of Calibration	In house calibration Done On	In house calibration Due On	Remarks	Sign





## Preventive Maintenance Schedule (Template)

LIST OF MACHINERY AND EQUIPMENT FOR MAINTENANCE

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	
_										

#### Preventive Maintenance Record (Template)

Machine/Equipment Name.: Machine/Equipment No.: Location:

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

## Fire extinguishers inspection record (Template)

Inspection	Extinguisher	Type/Specific	Due date of	Actual date	General	Signaturo
date	No.	ation	re-filling	of re-filling	condition	Signature





#### Product Release Record (Template)

Name of Product:	
Date of Manufacturing:	
Time of Manufacturing:	
Batch/Lot No.:	
Best Before/Expiry Date:	
Quality Acceptance	
Analytical	
Microbiological	
Sensory	
Others, if any	
Quality Lab signature	

Outgoing Vehicle Inspection Record (Template)

Date of Outgoing Vehicle:

Vehicle Type:

Material in Vehicle to be dispatched:

Date of Manufacturing:

Time of Manufacturing:

Batch/Lot No.:

Number of Persons accompanying Driver:

#### PARAMETER EVALUATED

REMARKS

Security lock			
Type of carrier (full covered/ Open Roof)			
Mode of covering products (in case of Open Roof)			
Overall Hygiene in the interior			
Overall Hygiene on the exterior			
Any sharp edges / points in the interior of vehicle			
Any pests detected			
Any grease /oil detected			

#### **Authorized Singature**





## **Document Revision History**

Old Version	New Version	Amendments done	Amendment Done By
& Date	& Date		
Draft 04;	Draft 05;	Addition of separate sections:	CHIFSS, CII-FACE
Nov 2016	Jan 2017	> Scope	
		Introduction of Baked Products- types, ingredients	
		Preface	
		<ul> <li>Definition of terms included for – Bread, Biscuit,</li> </ul>	
		Cake	
		<ul> <li>Different types of baked goods based on Health</li> </ul>	
		benefits	
		Allergen Hazards under Hazard Analysis	
		Allergen Control management	
		Cross- Contamination	
		Rework Management	
		Food Defense, Biovigilance and Bioterrorism	
		Reframed and Elaborated:	
		<ul> <li>Detailed Summary on Hazard Associated and HACCP</li> </ul>	
		Implementation on important Control Measures	
		Food Testing Facility	
		Training	
		Traceability and Recall Management	
		Acknowledgement section	





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