

# Design and Construction of Food Premises





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## PREFACE

The agro-food sector is of major importance in many economies worldwide. In many countries the food and drink industry is a leading industrial sector. Food is a serious component of everybody daily life activities and it is recognized the contribution of safe food to a healthy life. For this reason, food safety and the protection of end consumer health is of increasing concern not only for the consumers but also for governments, professional associations and all organizations involved in the food chain from the primary production to retailers and other food businesses that put food products at the disposal of the population. Food safety is used as a scientific discipline describing the handling, preparation, and storage of food in ways that prevent food-borne illness. This includes a number of routines that should be followed to avoid potential hazards. Food safety considerations include among others, the origins of food, the practices related with food labeling, food hygiene, food additives, control of hazards and good manufacturing practices. The prevention of the multiple type of hazards with very distinctive origins requires a comprehensive and integrated approach to food safety in order to address food safety risks in every day more complex and globalized food chains. All actors in a food chain have a responsibility to ensure the safety of food products at the stages of intervention, irrespective of the nature of the activities they carry out. This book is one of a collection that aims to facilitate to the users the understanding of relevant issues related with food safety.

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## DEDICATION

*To,*

*Our beloved teams at MonoJo Biotech and the Jordan University of Science and Technology (JUST) and everyone who contributed towards the success of this series of e-books.*

*This series of e-books has been prepared for the FOODQA Project which was co-funded by EU through Erasmus+.*

*The series of e-books has been composed with passion and is available for public access to provide a high quality reference on the best practices in food quality and safety that can be used by the food industry, relevant governmental bodies, students, professors, and academics.*

*Our heartfelt gratitude goes towards our Jordanian and European partners who dedicated their precious time and effort towards the success of this entire project.*

*We dedicate this work to our beloved country, Jordan, and its people and to our European partner countries.*

**- Prof. Fahmi Abu Al-Rub, Dr. Penelope Shihab, and  
Dr. Safwan Abu Al-Rub**



## Chapter 1

# THE PRINCIPLES IN THE DESIGN OF FOOD ESTABLISHMENT AND THEIR IMPORTANCE IN FOOD SAFETY

**Paulo Baptista**

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### Chapter Objectives

- Present the fundamental principles in the design of agri-food industrial establishments
- Present the basic principles of hygienic design of agri-food facilities
- Show the importance of fundamental principles in the design of agri-food industrial establishments and hygienic design of facilities for food security
- State the main factors to be taken into account when choosing the location of a new agri-food processing plant, particularly those that are most directly related to the product, and to present the most relevant aspects to be taken into account for all the factors listed
- Discuss the aspects of the surrounding to the agri-food manufacturing facilities that should be evaluated in the process of selecting a site for the construction of the establishment

### Introduction

An adequate conceptualization of agri-food industrial establishments should take into account not only operational aspects but also all other aspects that directly or indirectly have food security implications. Indeed, it can be said that food safety begins in the design and construction of the premises. These should take into account the type of food processing for which it is intended and the need to obtain good hygiene conditions.

The different areas of work within the establishment should be clearly defined, taking into account that the form of the establishment is conditioned to the type of procedures envisaged. Between sites with distinct functions there should be physical separations. This principle applies not only to productive areas and packaging of raw materials and final products, but also to all areas of production support. Thus, there should be exclusive and separate places for the storage of cleaning and disinfection products, storage of packaging materials and waste, among others.



**Erasmus+**

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Installations should be designed in such a way that the flow of the product is always from the most contaminated areas to the less contaminated areas, since the only way to efficiently prevent recontaminations is to ensure the separation of the circuits of the various products without any crossing or setbacks in the production lines. In some cases, it is even legally imposed that the areas of reception of the raw material and exit of the final product are located in opposite areas of one another.

This book intends to present in a simple way the basic aspects related to the design and construction of agri-food establishments, in particular in aspects related to security. This is not intended to be a technical manual for the design and construction of industrial establishments, although the associated basic principles are naturally presented. It is understood that it is also appropriate to extend this approach to equipment, so a chapter on this topic is included in this manual.

**This book is organized in five sections:**

- The principles in the design of agri-food industrial establishments and their importance in food security.
- The requirements of the installations.
- Construction, maintenance and modifications of agri-food establishments.
- Refrigeration facilities.
- Equipment requirements.

**Through these themes, the general objectives are:**

- Present the fundamental principles in the design of agri-food industrial establishments, in particular the basic principles of hygienic design of the facilities.
- Present the main factors to take into account when choosing the location of a new agri-food industrial establishment.
- Present the main requirements of facilities and materials used in construction, discussing the importance of meeting these requirements in terms of food safety.
- Raise awareness of the care to be taken during the preparation and execution of maintenance operations and changes in the agri-food establishment, presenting methodologies and good practices to implement in order to ensure food safety.
- Present the general principles of hygienic design to be considered in the design of equipment for the agri-food industry, discussing the determining characteristics in the selection of materials to be used in the construction equipment and their relevance in order to ensure the food safety of the products produced in it.

## PRINCIPLES OF HYGIENIC DESIGN OF FACILITIES

The design and construction of the facilities must not jeopardize the facilities, hygienic conditions of processing, packaging, storage and transport of the processed products.

**The installations shall be so designed as to:**

- Allow the development of adequate hygienic conditions for all operations, as well as personnel access, installation of equipment and storage and access of materials under appropriate conditions.
- Contribute to the reduction of bad hygiene practices in the elaboration of food products, facilitating the performance of the operations in good hygienic conditions. Ideally, the process should be carried out in a forward direction, from the raw materials to the final products, without any crosses being carried out following the operations.
- Facilitate the performance of the operations under the appropriate temperature conditions.
- Facilitate the carrying out of hygiene operations as well as production supervision activities.
- Minimize entry and development of pests and entry of environmental contaminants, such as: fumes, dust, odors, ash.
- Ensure that, where appropriate, circulation and access can be controlled to prevent cross-contamination. For example, entrances should not be carried out without adequate clothing, hand cleaning and changing or sanitizing the footwear.
- Ensure that operations that could cause cross-contamination of a food by another or by a material are separated physically or over time.

**With regard to this last point, cross-contamination can be minimized by:**

- Physical separation of food products and byproducts in processing, packaging, storage and transportation;
- The layout, designed to ensure that product in the course of production and final product does not cross production lines where the product has not yet been processed.
- The layout, designed so as to separate, where appropriate, high and low risk microbiological products, as well as the processes and people involved in them.
- Removal of secondary packaging prior to entry into production and production support areas.

## LOCATION

The construction of a new industrial establishment may involve either the choice of a new location or the construction in a pre-existing location. The wrong choice of location may have future product and cost implications.

Although the choice of a location can be based on factors such as: tax benefits, construction restrictions, possibility of rent or purchase of land or buildings on advantageous conditions, availability of capital, it should first of all respect the directly related factors with the products to be produced.

### Geological factors

Stability, subsoil load capacity (which can lead to increases in construction cost), slope of the terrain (sloping terrain allow for reduction of construction costs), land not subject to flooding, earthquake, collapsed are some of the geological factors to be taken into account when selecting the location of a new industrial establishment.



## **Size of the terrain**

The size of the terrain is an important factor to consider. The land should be of adequate size for the planned construction but space for future expansion should also be considered. A place too small may in the future raise logistical problems and even problems in the possibility of choosing the most appropriate solutions to ensure efficient hygiene.

## **Accessibilities**

When choosing a construction site, access by road, rail, water or air must be taken into account. Problems of traffic (traffic jams) or obstacles to land circulation (e.g. low bridges, weight limits) will have to be taken into account. Close connections to rail networks, the existence of multi-modal terminals, the proximity of seaports and airports could be crucial in the choice of location.

## **Water supply**

The existence of sources of drinking water throughout the year and over the expected lifetime of the plant should be taken into account. The quality of the available water should be adequate for different manufacturing uses. Mains water at certain locations may come from different locations throughout the year so their quality may vary. Another factor to consider is that mains water may be suitable for human consumption and not be suitable for the manufacture of certain food products. Another factor to consider is the cost of mains water and the possibility or necessity of using own water abstraction systems and costs associated with water treatment.

## **Industrial residues**

Wastewater produced in agri-industrial establishments contains large quantities of organic matter with high biochemical oxygen demand (BOD) and chemical oxygen demand (COD). These high values can cause problems at the level of external effluent treatment plants (municipal) and lead to increased costs (utilization rates). It may be necessary to consider the space required for the construction of an effluent treatment plant (or pre-treatment) before being sent to the public water system or to a watercourse.

The management of solid wastes should be well planned so that contamination problems do not arise. In addition to considering the legal provisions in force, it should be noted that solid waste storage sites should be sufficiently far from production areas so that there are no problems with pests (e.g. rodents, insects and birds), and are accessible to waste collection vehicles.

## **Energy needs**

Power is required for heating, lighting and process purposes at a plant. In planning for a new plant other than energy costs, account should be taken of the consequences of energy supply failures (e.g. electricity, gas) in the process and storage. Both current and future needs for gas and electricity within the manufacturing site should be taken into account.

## **Climate**

In choosing the location, consideration should be given to the risk of problems caused by bad weather (rain, excessive wind, snowfall), not only in terms of direct effects on facilities, energy supply and communications, but also in the supply of locally produced agricultural products, water supply waste disposal.

Prevailing winds should be taken into account in assessing the likelihood of contaminants being carried, such as odors, smoke, ash and dust, which may endanger the hygienic conditions of product processing.

### **Other factors**

The proximity of suppliers of raw materials and potential buyers of the final product is an important factor to consider when choosing the location of the agri-food industrial establishment. The existence of sources of fresh raw materials near the establishment can reduce transportation times and maximize the quality and safety of the final product.

The existence of skilled labor and its cost is important in the choice of location. It should not neglect aspects such as the existence of adequate technical support, the supply of parts for repairs, the existence of quality companies for subcontracting and the speed of response in solving technical problems.

Cultural or religious factors that may affect work in the establishment may also have to be taken into account.

## **FACTORY EXTERIORS**

Particular attention must be paid to the surroundings of the agri-food factory. A detailed study of the risk of pollution to and from adjacent areas should be carried out. This study may be difficult if the installation is to be located in an industrial park that is only partly installed.

The existence of trees and bushes around the factory can attract insects and birds to the factory area. The existence of streams and small lakes (natural or artificial) is also not advisable since it can be a factor in attracting birds and insects. Grasses, beneficial for the reduction of dust, should be kept well cut to avoid being an insect refuge.

The area chosen for the construction should not be in the floodplain. The existence of water courses or conditions that provide for flooding in situations of intense and permanent rainfall should be evaluated. Flood plans should be considered when necessary.

It is advisable around the buildings to have a range of about 60 to 90 cm free of grasses and bushes. This perimeter may be covered by stones or pebbles in order to avoid the growth of herbs and the appearance of rodents.

The proximity of forest areas should also be taken into account in assessing the risk in the event of forest fires occurring nearby. In case of location in an area of risk, preventive measures should be established, including the creation of a protection area around the plant where there are no trees and where the soil is regularly cleaned. The existence of a fire network outside the factory should also be considered and a fire plan must be established.

A convenient landscape arrangement of the factory environment contributes to a good image of the company and can have a beneficial effect on the disposition of the workers.

The design of access roads (roads and paths) within the manufacturing perimeter should take into account not only the logistical and road safety aspects but also the minimization of cross-contamination. In some cases, it may be necessary to restrict traffic so as to avoid contamination of the finished product. This will imply the existence of distinct routes and routes for the movement of vehicles carrying food and vehicles carrying by-products or waste.

Roads and paths should be kept in a good state of repair in order to prevent the formation of water pools (insect growth sites and microorganisms), reduce deterioration of the product in transit and prevent accidents.



Access piers, car or truck parks, waste storage facilities, boilers, and other outdoor equipment can be sources of contamination or pest shelter. In order to minimize these risks, it is necessary that these sites are properly cleaned and maintained and that they allow good drainage of water, either by use of drainage systems or by the slope of the land. Good drainage is necessary to prevent the contamination of the products by infiltrations in the soil and also to prevent the growth of pests.

The existence of a fence in the outer perimeter of the plant is fundamental. In addition to the obvious safety reasons it is also useful to prevent the entry of paper and other debris into the factory perimeter.



## Chapter 2

### CLASSIFICATION OF FOOD PREMISES

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#### Introduction

Any food businesses that involves handling, processing, preparation, preservation, packaging and transportation of food which intended for sale must be controlled by local government to provide a general guide for owners, proprietors, architects and / or builders who intend to design, construct / fit-out and operate a food premises or food vehicle. There are now four classes of food premises. The classification depends mainly on Risk management approach that based on the microbial hazards to ensure that the regulatory requirements are matched appropriately to the level of food safety risk associated with the food handling activities at different respective premises. Food businesses are classed into:

#### Very low risk premises

This class include premises that handle the sale of shelf stable pre-packaged low risk food such as crisps, frozen ice cream, UHT milk, bottled drinks, uncut fruit and vegetables and bread.

#### Low risk premises

This class include premises that handle unpackaged low risk food which is potentially hazardous. This include cooked food with the intention to be sold for immediate consumption. e.g. flour-based foods, health food and confectionery, cereals, flour based food, ingredients (such as flavoring or coloring), honey, oil and fat, soft drinksdrinks.... etc.

#### Medium Risk premises

This class include premises that preparing potentially hazardous food that is cooked, refrigerated, then reheated or se4lling high risk unpackaged food. For example, precooked rice dishes, stored in a cool room and then reheated or those preparing and selling potentially hazardous food containing raw ingredients that has not been sterilized such as homemade mayonnaise and desserts containing raw ingredients (such as eggs). These products are sold in Supermarkets, Take Away, Restaurants, Cafes, etc.

#### High Risk premises

This class include premises that provide meals to patients in hospitals, child care centers and aged care centers which serve potentially hazardous foods.



## Chapter 3

### GENERAL REQUIREMENTS OF FOOD PREMISES

**Majdi Al-Mahasneh**

Professor of Food Sciences and Technology at JUST.

#### Introduction

The design, location, layout and construction of food premises must be appropriate for the activities for which the premises are used and must provide adequate space for the activities to be conducted on the food premises and for the fixtures, fittings and equipment used for those activities and permit the food premises to be effectively cleaned and, if necessary, sanitized to ensure that food businesses can operate under hygienic conditions and produce food safely. Poorly designed and constructed buildings and equipment are potential sources of physical, chemical and microbiological hazards. Such hazards could cause illness or injury to consumers and so must be prevented or minimized. Similar food safety standards apply to the exterior of the premises, animal handling areas, refuse stores, staff changing facilities, wrapping and packaging stores etc.

Technical advice on the design and construction of new food premises or the rebuilding, refurbishment and alteration of existing premises should be obtained from suitably qualified and

competent professionals. It is advisable to use businesses or individuals that understand the operational and hygiene requirements of food establishments.

All new food premises are required to meet certain guidelines and existing premises are expected to make satisfactory progress towards upgrading their premises to these standards.

## GENERAL RULES FOR ALL FOOD PREMISES AND FOODSTUFFS

**The layout, design, construction, site and size of food premises are to:**

- Permit adequate maintenance, cleaning and/or disinfection, avoid or minimize air-borne contamination, and provide adequate working space to allow for the hygienic performance of all operations.
- Be designed to protect against the accumulation of dirt, contact with toxic materials, the shedding of particles into food and the formation of condensation or undesirable mould on surfaces.
- Permit good food hygiene practices, including protection against contamination and, in particular, pest control site food premises in locations that avoid or minimize potential threats to food safety.

**For sitting new premises, consider such factors as:**

- Suitability of the ground for building availability of services, especially power, drainage and potable water access/exit routes for vehicles delivering livestock or raw materials or transporting product and for staff transport - need to dispose of animal by-products - proximity near to residential areas - prevailing wind Avoid locations close to, for example: - environmentally polluted areas - industrial activities that might present a risk of contamination (e.g. chemical production, areas prone to flooding).
- An adequate number of flush lavatories are to be available and connected to an - effective drainage system. Lavatories are not to open directly into rooms in which food is handled.
- Compliance regarding provision of toilets for example: There are sufficient flush toilets for the number of employees available toilets do not open directly into food-handling areas.
- Toilets are connected to a mains sewerage system or septic tank.

An adequate number of washbasins is to be available, suitably located and designated for cleaning hands. Washbasins for cleaning hands are to be provided with hot and cold running water, materials for cleaning hands and for hygienic drying. Where necessary, the facilities for washing food are to be separate from the hand-washing facility. Consider the following factors:

- There are enough designated hand washbasins for the number of employees at suitable locations.
- Hand washbasins are supplied with hot and cold running water.
- Hand washbasins have supplies of soap or detergent, and hand drying facilities.
- Hand washing facilities are separate from food washing facilities.
- Hand washbasins should be placed conveniently close to toilets, entry points for food handling areas and workstations, to encourage staff to wash their hands after visiting the toilet, before entry into food handling areas and during food handling activities.

Allow the flow of food in one direction, from receipt, to storage, to preparation, to packing / serving / dispatch incorporating in the design process provision for safe food handling practices to ensure that the risk of contamination is minimized. Consider the following factors:

- Sufficient dining space, allowing 1m<sup>2</sup> per person for dining area.
- Potential for future expansion. If in the future you wish to upgrade the type of food preparation, then you may also need to upgrade the premises.
- The kitchen incorporating crockery equipment, chemical, food storage, washing areas, wet and dry preparation areas, refrigeration and cooking areas.
- Separation of raw products and cooked from final products.
- Sanitary conveniences for both staff and customers.
- Space for change-rooms and storage area for personal items.
- Cleaning storage for cleaning equipment, chemicals and cleaners.

## WATER SUPPLY

The water supply must be provided in an adequate quantity, potable and of an appropriate temperature. To achieve this ensure:

- Hot water system installed in adequate capacity for the activities occurring at the premises.
- Storage hot water systems to be located at least 150mm from adjacent.
- Vertical surfaces, be supported in metal legs 150mm in height or.
- Placed on a concrete plinth.
- Mains water supply, where main water is unavailable another approved water source (i.e. Bore or water tank).

The premises must have a sewage and waste water disposal system which Effectively disposes of all sewage and wastewater. It is to be constructed and located so that there is no likelihood of the sewage and wastewater polluting the water supply or contaminating food.

The premises must have waste facilities that adequately contain the quantity and type of waste and recyclable matter. A bin storage area needs to be provided and must include:

- An access way of at least 1m in width fitted with a self-closing gate.
- Smooth impervious floor of not less than 75mm thickness, evenly graded and adequately drained to an approved liquid refuse disposal system.
- Fats and oils stored in leak proof containers are to be regularly collected by a waste removal contractor.
- Sized to adequately contain all waste receptacles and to allow easy access or removal of bins.

Mechanical exhaust ventilation systems to be designed, constructed and installed. Detailed plans showing design, outlet location (in relation to air-conditioning or air intakes, and neighboring properties where applicable) and performance are required to be submitted with the application.

**Mechanical ventilation is required to be installed for:**

- Cooking equipment where electrical input exceeds 8kW.
- Cooking equipment where gas input exceeds 29MJ/h and all deep fryers.



Lighting Food premises must be provided at all times with natural and / or artificial lighting, suitable for the activities conducted within the premises.

Light fittings must be easily and effectively cleaned, unable to provide harborage for pests and constructed to protect food from contamination. Light fittings must be provided with protective plastic covers or sleeves to prevent contamination of food with broken glass.

## DESIGN AND LAYOUT

Food premises must be big enough. They must have sufficient space to do all that is required to run a hygienic and efficient food operation. The amount of space required depends on the complexity of the operation. So don't take on premises which are far too small unless you intend to start small and then move when the businesses grows.

**The design and layout of a food room should:**

- Allow access to all areas for cleaning and maintenance.
- Allow a natural flow of production from raw to ready-to-eat which will minimize cross contamination.
- Where drainage gullies or channels are provided the floor should be sloped to ensure that water drains naturally to these.
- As far as possible, kitchens and food storage rooms should face north to minimize solar heat gain.
- Walls and roofs (especially flat roofs) should be well insulated to avoid the formation of condensation and mould.

### Maintenance

Both the structure of food premises and equipment must be maintained. This means proactive maintenance to ensure things don't go wrong rather than just fixing things when they are broken or damaged. Once things start to deteriorate they cannot be properly cleaned or disinfected and food safety risks start to creep in.

### Food premises are to be kept clean and maintained in good repair and condition

Floor surfaces are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect.

Wall surfaces are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect.

- Surfaces (including surfaces of equipment) in areas where foods are handled and in particular those in contact with food are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect.

**All articles, fittings and equipment with which food comes into contact are to:**

- Be so constructed, be of such materials and be kept in such good order, repair and condition as to minimize any risk of contamination with the exception of non-returnable containers and packaging, be so constructed, to enable them to be kept clean and, where necessary, to be disinfected.

## DESIGN AND CONSTRUCTION

### General requirements

The food premises must comply with the requirements of Food Safety Standard 3.2.3 Food Premises and Equipment

(FSS 3.2.3). The additional following information may be useful when designing your food premises (follow the FSS 3.2.3 headings which match the ones below).

**Food business design must aim to:**

- Exclude locations that may allow harbourage to vermin by such measures as eliminating cavities, cracks and crevices.
- Facilitate easy cleaning by measures such as providing open access to all surfaces where grease and dust may accumulate and ensuring that all surfaces are durable, smooth, impervious and washable.
- Allow the flow of food in one direction, from receipt, to storage, to preparation, to packing/serving/ dispatch incorporating in the design process provision for safe food handling practices so that the risk of contamination is minimized.

**Consider the following factors:**

- Sufficient dining space, allowing of 1m<sup>2</sup> per person for dining area.
- Potential for future expansion. If in the future you wish to upgrade the type of food preparation, then you may also need to upgrade the premises.
- The kitchen incorporating crockery/equipment/chemical/food storage, washing areas, wet and dry preparation areas, refrigeration and cooking areas.
- Separation of raw products and cooked/final products.
- Sanitary conveniences for both staff and customers.
- Space for change rooms and storage area for personal items.

**Layout**

Food contamination can be minimized by physically separating the areas where raw products are handled from the areas where the final product is ready for dispatch or service. Similarly, wash up areas and staff amenity areas should be separated from areas where food is prepared. Layout of the premises can also affect the ease of keeping premises clean. For example, it helps cleaners if storage rooms for cleaning equipment are close to the areas where the equipment is used. Staff and visitors may bring contamination into food handling areas if access doors are badly placed. Where possible, and where important to prevent food contamination, access to staff entrances, amenity rooms, change rooms and personal hygiene facilities should be located so that staff do not have to cross food preparation areas.

## MATERIALS

**Characteristics of Suitable Construction Material**

Construction materials for food processing and auxiliary system equipment that are in contact with foods or cleaning agents should have certain characteristics:

1. Resistance to corrosive action of foods or chemicals (Cleaning and sanitation agents) that may converge with exposed surfaces of construction materials.



2. Suitable surface finish to discourage buildup of dirt that can accumulate with excessive surface rugosity.
3. Good mechanical behavior according to performance of mechanical functions, such as structural strength, resistance to abrasion and physical or thermal shocks, and pressure charges.

## Types of materials and applications

The most common materials used for constructing the Food Equipment are:

### 1. Stainless steel

Steel exhibits some of the most suitable characteristics of the construction materials used for food equipment. It is the most widely used material in direct contact with food found in the industry. Of the types available, AISI 304 stainless steel is the most commonly used. (AISI – American Iron Steel Institute) Composition of the Different Types of Stainless Steel Corrosion Under special corrosion conditions, such as handling of acidic fluid foods or foods containing SO<sub>2</sub>, AISI 316 or 316L stainless steel should be employed with preference over AISI 302 or AISI 304. AISI 302 stainless steel is used to improve the external design appearance of food equipment, but not equipment in contact with food or corrosive agents. The corrosion resistance of stainless steel is due to the spontaneous formation of a layer of chromium oxide on the surface of the material (as a protective coating) when exposed to air. This layer can be formed artificially by treating the surface with nitric acid (20–30% at 60°C) for 30 minutes.

**Composition of different types of stainless steel alloys**

	C	Mn	P	S	Si	Cr	Ni	Mo	Se
AISI 302	0.15	2.00	0.045	0.030	1.00	17.00	8.00	—	—
	max	max	max	max	max	19.00	10.00		
AISI 304	0.08	2.00	0.045	0.030	1.00	18.00	8.00	—	—
	max	max	max	max	max	20.00	12.00		
AISI 316	0.08	2.00	0.045	0.030	1.00	16.00	10.00	2.00	—
	max	max	max	max	max	18.00	14.00	3.00	

### 2. Aluminum

Aluminum has a high thermal conductivity, around 217 W/m. K or 187 kcal/h. m. °C, and a specific weight of 2700 kg/m<sup>3</sup>. It is corrosion resistant under normal conditions during the distillation of water, fruit juice, milk, and SO<sub>2</sub>. It does not, however, resist attack by hydrochloric and hydrofluoric acid, or caustic solutions. For this reason, alkali products must not be used with this material. Acid cleaning agents, on the other hand, are appropriate for aluminum. Currently, aluminum is used in the construction of some parts of food process equipment. It is not as corrosion resistant as stainless steel, and it is not as resistant to abrasion from cleaning and sanitization products and foodstuffs.

### 3. Nickel and Monel

Nickel and Monel Pure nickel and monel (an alloy with 67% nickel, 28% copper, and the remainder iron and manganese) were widely used in preference over nude or tinned copper for food equipment until stainless steel proved to be the more satisfactory material. An alloy of nickel, zinc, and copper has been used in casting pieces for valves, mainly for closing devices, since it exhibits better mechanical abrasion resistance than nickel or



stainless steel. Monel is the preferred material for common salt processing systems since it exhibits even better corrosion resistance than stainless steel. It is also employed in pumps that handle alcohol, brines, vegetal oils, and fruit juices.

#### 4. Plastic Materials

Plastic materials are used in harvesting and transporting agricultural raw materials to the food processing plant, in food packaging of solid and liquid foods, and even in food process equipment (mainly processing tanks). The most important plastics are:

- Polypropylene.
- High density polyethylene.
- Rigid PVC.
- Polyester.
- Epoxy resins.

#### Food transport

Vehicles used to transport food must be designed and constructed to protect food if there is a likelihood of food being contaminated during transport. Parts of the vehicle and food contact surfaces used during transport must be designed and constructed so that they can be effectively cleaned.

##### Minimum requirements

Food must always be transported in a way that minimises the risk of contamination. Food transport vehicles that store potentially hazardous food must be capable of maintaining product at required temperatures at or below 5 °C or, at or above 60°C.

The design of a food transport vehicle and containers must allow for easy cleaning procedures and protect transported food against contamination.

Food transport vehicles must be approved by the relevant local government, however do not have the same requirements as a mobile food premises.

##### Mobile food vehicles

When designing and fitting out a mobile food vehicle, it must meet the required outcomes from the Food Safety Standards the same as a fixed premises such as a restaurant, takeaway food outlet or café.

##### What is a mobile food premises?

**Mobile premises, for a food business, means:**

- A vehicle from which a person sells unpackaged food by retail, or
- A food vending machine.

A vehicle is defined as anything, whether operational or not, used to carry anything or any person by land, water or air. It should be noted that the definition for a mobile premise relates to a vehicle, not a motor vehicle.



Mobile premises are generally considered to be permanent set ups where the lay out does not change, yet the premises can be moved between locations. Mobile premises may include caravans, ships, food carts or movable buildings such as demountable buildings or containers. Mobile premises do not include food transport vehicles used to transport food for off-site catering or for the home delivery of food by order (e.g. pizza home delivery).

A food vending machine means a machine or device operated by money, token, debit card or credit card and used, or intended for use, for the sale of food. This component of the guide relates to mobile food vehicles only.

## WALLS

Walls that are adjacent to food preparation areas or likely to be splashed with water must be impervious to grease, food particles and water. Wall surfaces in kitchens and other processing areas must be finished with materials such as ceramic tiling, vinyl sheeting or stainless steel. Other materials such as steel-troweled concrete or cement render, coated or sealed to be impervious, may be appropriate.

### **Walls must be constructed to have the following characteristics**

- Be appropriate for activities conducted on the food premises.
- Ensure easy and effective cleaning.
- Protect food from contamination where necessary.
- Prevent the entry of dirt and dust and prevent entry and harborage of pests.
- Prevent absorption of grease, food particles and water.

### **Wall construction**

- Walls are to be solid and of framed or preformed panel construction and voids can be filled with a suitable material.
- Cover strips are not permitted in food preparation areas as they allow dirt and grease to accumulate.
- Joints between preformed panels must be filled and finished flush with the surface of the sheeting material.

### **Wall finishes for food preparation areas**

- Walls must be finished with high gloss, washable, light colored and easy-to-clean surface.
- Any finish continued above ceramic tiles should be finished flush with the tiles to prevent the accumulation of any dirt and grease.
- Skirting boards, architraves, picture rails or similar protrusions on the walls in food preparation areas are not recommended.
- Walls at the rear of cooking appliances must be surfaced with an impervious material, such as stainless steel, which extends from the canopy to the floor. Where a cooking appliance is sealed to the wall, the material must be lapped over the top edge of the appliance to provide grease and vermin proof seal. Cooking appliances must only be sealed to walls made of a non-combustible material.
- Splash back walls at the rear of benches, sinks and hand basins must be surfaced with an impervious waterproof material to a minimum height of 30 cm.

- In wet areas, the bottom plate in all timber framed partitions in food preparation areas must be placed on a “dwarf” wall constructed of concrete or similar material, and constructed approximately 7 cm above the floor.
- Walls in food preparation areas are to be finished with an approved material such as:
  - ✓ Glazed tiles (Not suitable for wash down areas) preferably laid to a minimum height of 2 meters (m).
  - ✓ Stainless steel or aluminum sheeting.
  - ✓ Acrylic or laminated plastic sheeting.
  - ✓ Polyvinyl sheeting with welded seams.
  - ✓ Pre-formed panels, villa board or compressed ac sheeting.
  - ✓ Troweled cement (Polished surface) may be appropriate in some circumstances.

Finish	Wet Washed Areas	Food Preparation	Vegetable Preparation	Servery	Store Room	Chillers/ Freezers	Bin Store	Eating Areas	Comment
Stainless steel	✓	✓	✓	✓	✓	✓	✓	✓	Welded joints & waterproof screw covers
Ceramic tiles	✓	✓	✓	✓	✓	✓	✓	✓	Epoxy grout
Vinyl sheets	✓	✓	✓	✓	✓	✓	✓	✓	Heat welded joints
Painted plaster					✓		✓	✓	Smooth finish
Feature brick								✓	
Aluminium sheet	✓	✓	✓	✓	✓	✓	✓	✓	Welded or sealed joints
Steel sheet							✓		Welded or sealed joints
Trowelled cement		✓	✓	✓	✓	✓	✓	✓	Polished surface
Wood panelling								✓	Wood sealed
Painted brickwork					✓		✓	✓	Flush joints and solid surfaces
Concrete					✓		✓	✓	Sealed smooth surface
Pre-formed panels	✓	✓	✓	✓	✓	✓	✓	✓	H bar joints mastic sealed.

**Table 1:** Suitability of wall finishes.

\* Based on Food Safety Standard 3.2.3 (Food Premises and Equipment) and the Australian Standard 4674-2004 (Design, construction and fit-out of food premises).



## WINDOWS

- Windows Should be located at least 300mm above the bench, sink or hand basin.
- Ledges must be splayed at a 45° angle to prevent accumulation of dirt, food and grease.
- Swing window perspex are used for protection from exterior dust.
- Windows within food preparation areas shall be permanently fixed, or in the case of a window which can be opened, it shall be fitted with a tight fitting permanent mesh screen that can be easily removed and replaced for cleaning.
- All external windows must be fitted with close fitting mesh insect screens.
- Windows, window frames, window sills and other surrounds to openings in walls and ceilings are fittings attached to the wall or ceiling and should be covered.
- Windows and other openings, doors and surfaces in rooms where foodstuffs are handled are capable of being cleaned, disinfected and maintained in sound condition.
- Windows (and other openings such as skylights or external doors) need to be capable of being cleaned and maintained to prevent the accumulation of dirt.
- Windows/skylights in rooms where food is handled may compromise the product temperature and, if opened for ventilation during production periods, must be fitted with appropriate insect-proof screens.
- Windows and other openings are to be constructed to prevent the accumulation of dirt. Those which can be opened to the outside environment, where necessary, to be fitted with insect-proof screens which can be easily removed for cleaning. Where open windows would result in contamination, windows are to remain closed and fixed during production.

## DOORS AND DECKS

Staff and visitors may bring contamination into food handling areas if access doors are badly placed. Where possible, and where important to prevent food contamination, access to staff entrances, amenity rooms, change rooms and personal hygiene facilities should be located so that staff do not have to cross food preparation areas. Doorways and passages should be wide enough to allow cleaning equipment such as electric foaming machines to be used if that is the intended method of cleaning.

Avoidable environmental contaminants including dirt and dust should be excluded so that the premises are easier to keep clean and food is less likely to be contaminated.

**Some examples that illustrate the requirement are listed:**

- If dust and dirt are likely to be blown through doorways, for example doorways opening to the exterior of buildings, then doors in doorways should be close fitting. (This will also help to deter pests.)
- Air intakes for ventilation systems must not draw in contaminated air.
- Toilet areas, laundries and living areas must be separated by airlocks or self-closing doors from areas handling exposed food. Alternatively, possible contamination should be removed by mechanical ventilation to areas not used for food preparation. The design and construction of the premises should be assessed taking into account

likely contaminants, ingredients used, the types of foods prepared and handling methods, movement of staff and products, and any controls in a food safety program that this business may implement.

- Doors and serving hatches are to be finished on both internal and external sides with the same standard of material as the walls.
- The driving compartment of the vehicle must be separated and sealed from the food preparation and storage section.
- Doors must be able to be opened from the inside and an alarm fitted in accordance with the Building Code.
- All openings on the mobile food vehicle are to be fitted with close-fitting doors and shutters. These must be vermin-proof and able to be closed during transport.
- Pest-proof doors and entrances into the building by installing fly screen doors or self-closing doors.
- Installation of pest-proof roller doors. This must include:
  - Installation of weather strips at the bottom of the roller shutters sides of the roller shutters fitted tightly into the housing.
  - Installation of a pest-proof material at the top of the roller shutter to fill the gap usually left when the shutter is closed overnight.
- Install mesh screens at opening windows or other ventilation openings.
- Install appropriate flashing to the base of wooden doors if there is a problem with mice gaining access through doorways.
- Architraves around doorways and windows, window frames, window sills and other surrounds to openings in walls and ceilings are fittings attached to the wall or ceiling and are covered.
- Sliding doors to display cabinets must have bottom guides or runners terminating not less than 25 mm from each end of any door opening for easy cleaning.
- Doors and curtains (Such as plastic strip curtains) are also considered to be fittings.
- Doors should be able to be easily and effectively cleaned, especially any handles, knobs or plates that come into contact with food handlers' hands, and they must be constructed so that they do not allow insect infestation.
- Air curtains, if used, are to cover the whole of the face of the doorway or opening and should have a velocity of not less than 300 metres per minute measured at 1 meter from the floor.
- Roller doors and automatic doors should be arranged so that air curtains come into operation immediately after the door begins to open.
- Where electric insectocutors are used, care should be taken to install them in a suitable area, not located directly over food preparation working areas and away from any exposed food.
- Bi-fold or other types of doors that open up the dining area to the outdoors are only permissible if the kitchen and all other food preparation areas are adequately protected from outdoor contaminants such as insects and dust.



- External doors – these need to be wide enough to allow the easy movement of staff, equipment and/or vehicle, as appropriate, but also tight fitting (i.e. so light is not visible around the frame when closed). Where doors are in frequent use (e.g. loading bays) additional measures (e.g. overlapping plastic strips or self-closing mechanisms) may help to minimize pest access.

## CEILINGS

### General requirements

- The ceiling height in a food premises must be greater than 2.4 m.
- Ceilings must be free of cracks, open joints and crevices.
- The intersection of walls and ceilings must be dust-proof, tightly jointed and sealed.
- The ceiling must be finished with a material that is washable and impervious.
- Drop in panels are not to be used in food preparation or display areas.
- Ceilings must be finished in a light color to facilitate cleaning.

### Approved materials for ceilings include:

- Plaster board.
- Fibrous plaster.
- Fibrous cement.
- Cement rendered with steel trowel.

Finish	Wet Areas	Vegetable Preparation	Servery	Store Room	Fridges/ Freezers	Bin Store	Eating Areas	Comment
Painted plaster	✓	✓	✓	✓		✓	✓	Smooth finish
Steel Sheet	✓	✓	✓	✓		✓	✓	
Trowelled cement	✓	✓	✓	✓		✓	✓	Polished surface
Wood panelling							✓	Sealed surfaces
Concrete	✓	✓	✓	✓		✓	✓	Sealed smooth surface
Pre-formed panels	✓	✓	✓	✓		✓	✓	
Acoustic panels							✓	Suspended T-bars
Decorative panels							✓	

**Table 2:** Suitability of ceiling finishes in food premises.

\* Based on Food Safety Standard 3.2.3 (Food Premises and Equipment) and the Australian Standard 4674-2004 (Design, construction and fit-out of food premises).

## FLOORS

Floors must be designed and constructed so that they are appropriate for the activities conducted on the premises, can be effectively cleaned, do not absorb grease, food particles or water, are laid so there is no ponding of water and are unable to harbor pests.

### Floors characteristics

**General requirements:** For effective cleaning, floors in kitchens and wash up areas must be resistant to hot water, steam and chemicals, smooth, free from cracks and crevices.

**Specific requirements:** Floors have to be designed and constructed as follows:

- They are suitable for the activities conducted on the premise.
- They can be effectively cleaned, do not absorb grease, food particles or water
- They are laid so there is no ponding of water
- They are required to be unable to provide harborage for pests (to the extent that is practicable)

### Floors drainage

Floors flushed with water or hosed down must be graded sufficiently to allow water to drain away with a slope of at least 1:100. A floor waste should be installed so that the water drains to a drainage system freely. Floor wastes are required in premises where:

- Significant wet cleaning is required.
- Large food manufacturing premises.
- Large amounts of liquids are used.

In premises requiring floor wastes, no dips or hollows where water can collect are permitted.

### Cleaners sink

One of the following facilities is to be provided for dispensing of mop water or similar liquid waste and to enable cleaning equipment, including mop buckets to be cleaned:

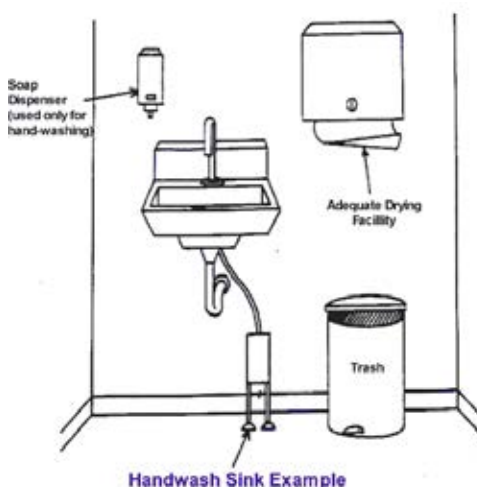
- A cleaner's sink or.
- Floor waste, (additional hot and cold water taps are to be provided to fill the bucket separate from food and equipment sinks) or.
- Other similar facility connected to drainage that is not intended for use to prepare food, wash equipment or hand washing.

### Hand washing facility

- An adequate number of wash hand basins, dependent on the size and use of the premises, must be provided for hand washing only. Each basin must have hot and cold (or mixed) running water. Wash hand basins are required close to toilets and at strategic locations e.g. at the entrances to kitchens (additional basins may be required in larger premises).



- Paper towel and liquid soap dispensers should be provided at each wash hand basin. Wash hand basins with non-hand operated taps are preferable but are not a requirement.
- Thorough washing and drying of hands is an essential activity in a food business to reduce the risk of food contamination and food-borne illness.
- Unobstructed by any other equipment and easily accessible.
- Not located under benches, i.e. an appropriate hand basin height is usually 900 mm off the floor.



**Figure 1:** Typical hand washing facilities.

## Toilets

- An adequate number of toilets must be provided for employees.
- There must be an intervening space between rooms containing sanitary conveniences and rooms in which food is handled.
- Hand washing facilities are required close to all toilets.
- Minimum requirements 1 W.C. for up to 5 employees, 2 W.C's for up to 25 employees or if men only 1 W.C. and 1 urinal for up to 15 men.
- If such facilities are to be used by males and females each WC must be contained in a separate room which is lockable from the inside.
- It is good practice to have toilet facilities for food handlers separate from those for customers and others.
- Further advice is available from this Department.

## Floors materials

Floor material must be durable enough to withstand damage due to the type of operation or activity (e.g. floors beneath cooking appliances must be able to sustain high temperatures). Some examples of floors that meet this criterion may include sheet vinyl and epoxy resin, glazed tiles with flush epoxy grouting. On the other hand, timber



floors, carpets and other absorbent matting which cannot be effectively cleaned are not permitted in any food preparation, storage or wet areas.

**For food preparation areas Floor finishes must have the following characteristics**

- Floors should be finished with an approved material and laid to a smooth surface. They have to be free from cracks and crevices. Table 3 shows the suitability of floor finishes in food preparation areas.
- Floor finishes must be light colored for ease of effective cleaning.

Finish	Water Areas	Food Preparation	Vegetable Preparation	Servery	Store Room	Chillers/ Freezers	Bin Store	Eating Areas	Comments
Stainless Steel non-slip	✓	✓	✓	✓	✓	✓	✓	✓	Welded joints
Ceramic tiles	✓	✓	✓	✓	✓	✓	✓	✓	Epoxy grout
Quarry tiles	✓	✓	✓	✓	✓	✓	✓	✓	Sealed
Steel trowel case hardened concrete					✓	✓	✓	✓	Smooth sealed; finish no joints
Carpet/ carpet tiles								✓	
Wooden flooring								✓	Sealed
Poly vinyl sheet	✓	✓	✓	✓	✓	✓	✓	✓	Heat welded joints
Vinyl tiles			✓	✓	✓	✓	✓	✓	
Plastic matting				✓				✓	
Cork tiles								✓	Sealed
Epoxy resin	✓	✓	✓	✓	✓	✓	✓	✓	

**Table 3:** Suitability of floor finishes in food preparation areas.

\* Based on Food Safety Standard 3.2.3 (Food Premises and Equipment) and the Australian Standard 4674-2004 (Design, construction and fit-out of food premises).

## STAIRS, LIFTS AND PLATFORMS

All stairs, lifts and platforms used in food premises should be designed and installed to minimize contamination, accumulation of dust and entrance of pests. All equipment brought into the facility should be cleaned and inspected properly. All equipment should be maintained properly (i.e., no flaking belt material on conveyors, no loose parts that can fall into product, or no loose parts that are constructed of material that may adulterate product). All product handling and delivering equipment should be checked regularly for sanitation procedures to ensure that non-food contact surfaces do not cause adulteration of product.

## LIGHTS, VENTILATION AND EXHAUSTIONS

### Lights:

Illumination of the Processing Facility in the workplace is easier to maintain in a well-illuminated plant than in a dark and dull facility. Working in an environment that is perceived to be clean promotes neat and tidy work habits.



Good illumination enhances the operation of a well-run plant and promotes efficiency and safe working conditions. Good lighting is an easy goal to reach and a quick fix to eliminate dark corners and unsafe work areas. The range of lighting hardware makes it possible to have a well-lit plant. Industry recognizes standards that should be met or exceeded. When a lighting system is designed, the following points should be considered:

- Distribution pattern of the light and suitability in the area involved.
- Illumination output of the light hardware.
- Possibility that larger lamps can be used in the same fitting when more light is required.
- Design and construction of the lamp and its fitting.
- Change in lamp efficiency over time and ease of periodic servicing, cleaning, and replacement.
- System cost Light is measured in luminous intensity as candela (cd) in SI units.

Offices	Illumination (Candela)
Designing, detailed drafting	200
Bookkeeping, auditing, tabulating, rough drafting	150
Regular office work, filing, index references, mail sorting	100
Reading or transcribing handwriting in ink or medium pencil	70
Reading high-contrast or well-printed material	30
Corridor, elevators, stairways	20

**Table 4:** Recommended Levels of Illumination.

## Light intensity and application

In any work area, the light should be diffused and uniformly constant. As a rough guide, 5 watts of fluorescent lighting per square meter of floor area provides 100 Lux of lighting for premises with ceiling heights up to 3.0 meters. For the most efficient use of available light, the ceiling should have a minimum reflectance of 75% and the sidewalls 50 to 60%. The floor should be 20% reflective. To prevent eyestrain, glare should be avoided. The amount of light reflected off any surface is affected by the smoothness of the surface. When the surface is rough, the reflection will be scattered, and the reflected light will diffuse. When the paint surface is smooth, irregularities in the painted surface can cause glare. The color of the paint will also affect the amount of light reflected. Because walls are normally fairly smooth, color is the dominant factor in determining reflectance and illumination. Light colors reflect high proportions of light, while dark colors absorb a lot of light. There is obvious variation between shades of the same color. Human perception of color is influenced by the color of the light that illuminates it. When the dominant color in an area is cream, ivory or tan, white fluorescent lighting will be best. If the dominant colors are blue or green, the blue type fluorescent lights will work best.

## Types of lamps

Many types of lamps are used in processing areas. In most cases, fluorescent lamps are favored because they have about 2.5 times the efficiency of incandescent lamps. They also give soft diffused light without glare. Fluorescent lamps are best suited in areas where the lamp stays on for long periods of time. In places where lamps are frequently switched on and off, fluorescent light should not be used. Frequent on and off service not only results in a short lifespan of the lighting element but places an extra load on the starting transformer. Fluorescent lamps can be used for about 2500 to 4000 h before they need to be replaced.

Incandescent lamps must be replaced every 800 to 1000 h. Most installations use fluorescent lighting in all areas possible. In some high moisture areas, including cold rooms and where explosive vapors may be present, incandescent light fittings with vapor-proof fixtures are required. In the cereal industry, cereal dust can be very explosive when mixed with the right amount of air. In these cases, light bulbs and all fittings are completely enclosed and water tight.

At loading docks, large warehouses and outside areas, where extensive coverage is required, mercury vapor lamps are used. Mercury vapor lamps are several times more efficient than fluorescent lighting. Incandescent lamps radiate more long-wave radiation in the yellow and red ranges, while fluorescent lighting is bluer. Incandescent lamps produce light and heat. This is an obvious drawback in cold storage areas. If fluorescent lighting is used in cold rooms, the tubes must be rated to operate at temperatures below 5°C. The installation cost for fluorescent lighting is considerably greater than the cost for incandescent lighting. The energy savings will pay for this additional expense over time. All light bulbs should be replaced at regular intervals. Replacing them only if they are broken means that there will be one or two lights out at any given time. Lights have an average lifespan and should be replaced before they break.

### **Ventilation and exhaustions**

Food premises must have sufficient natural or mechanical ventilation to effectively remove fumes, smoke, steam and vapours from the food premises.

- All areas must be suitably and sufficiently ventilated including dry goods stores to prevent excess humidity or heat.
- Within the processing area, ventilation will remove obnoxious odors, moisture, and heat and replace it with air that is free from contaminants and air that will increase the comfort level of workers. The amount of air is calculated as a replacement volume. Depending upon the production processes, the air can be replaced from 6 to 20 times per hour.
- Conditioning can include alteration of moisture content, change of temperature, and filtering to remove particulates and organisms.
- It is also advisable to keep the processing area under a slight positive pressure. This will ensure that processing area air flows out when a door is opened. Special air is required in areas where baby formula is handled or where aseptic operations take place. In these cases, air will be filtered through special filters that will remove organisms. The processing area must be under positive pressure at all times so that no organisms can enter from adjacent processing areas.
- Toilets must be adequately ventilated directly to the external air to prevent aerosols and odors from entering food rooms. Areas where moisture and cooking fumes are generated e.g. cooking areas, wash up areas, bakery ovens, fryers, hot plates etc. must have mechanical extraction, extraction canopies and grease filters and where they are considered necessary.
- Cooking odors should be extracted to a point where they can disperse in the atmosphere without causing nuisance to occupants of the building or any surrounding buildings. This can usually be achieved by terminating the ducting one meter above the main eaves (or any roof windows). Where it is not practicable (or necessary) to terminate ducting above the main eaves it should terminate away from windows to minimize nuisance.
- Systems are available to deodorize cooking fumes and may be worth considering in such circumstances. Air should not be drawn into clean areas from dirty areas e.g. toilets, pot wash areas.



## Natural ventilation

Natural ventilation is only suitable where there is little or no cooking that generates steam or greasy air. The premises must have openings, such as doors, windows and/or vents open to a clean environment.

## Mechanical ventilation

**A mechanical ventilation system that complies with the applicable standard as follows:**

- The apparatus has:
  - A total maximum electrical power input exceeding 8 kilowatts (kw), or
  - A total gas power input exceeding 29 megajoules per hour (mj/h), or
  - The total maximum power input to more than one apparatus exceeds:
    - 0.5kW electrical power for each 1m<sup>2</sup> of floor area of the room or enclosure, or
    - 1.8MJ gas for each 1m<sup>2</sup> of floor area of the room or enclosure
- Dishwashers and other washing and sanitising equipment that vent steam into the area to the extent that there is, or is likely to be, condensation collecting on walls and ceilings.
- Equipment installed in the premises after the mechanical ventilation system has been designed and installed must not impair the efficiency of the system or the natural ventilation.

In the case where no general exhaust is provided to remove fumes, smoke, steam and vapour from an enclosed kitchen, a local mechanical exhaust system may be required even if the power input of the apparatus does not exceed the thresholds of the applicable Standard.

## Filters

Canopies are to be fitted with grease filters which can be removed for easy cleaning. The filter must comply with the applicable Standard.

## Food premises exhaust hood airflow

The airflow required for a food premises exhaust hood will depend on the:

- Hood type.
- Cooking process.
- Length of the hood.
- Inside perimeter of the hood over all exposed sides.
- Height of the hood above cooking appliances.

## Discharge point

Exhaust should not discharge over adjoining properties or where the discharge is less than 3m above any pedestrian thoroughfare including an accessible roof area.

Exhaust ventilation for wood-fired and solid fuel cooking equipment needs to be separate to other ventilation systems and must not be combined with systems serving grease appliances, or oil generating or oil-heat appliances.

## Dining areas

Dining areas are to be ventilated by natural or mechanical methods.

Additional considerations should be given to the nuisance effects of noise and odour emissions upon the surrounding environment.

It is advisable when constructing new premises, to allow for possible future expansion of cooking equipment.

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### Sanitary rooms - General requirements

Premises for sanitary and hygienic services are divided into general (cloakrooms, washrooms, showers, toilets, smoking rooms, lounges, and others) and specialized (rooms for drying and cleaning of work clothes, heating, respiratory equipment, and so on). The contents of premises and the quantity and kinds of technical sanitary and other equipment are determined in accordance with existing draft plans for auxiliary buildings and premises of industrial enterprises. Cloakrooms, showers, and washrooms are usually combined in so-called cloakroom blocks, situated on the shortest route from the enterprise entrance to the work sites. Smoking rooms, toilets, lounges, and other premises used many times during the day are situated no farther than 75 m from the work sites.

Food handling facilities must be clean, maintained and in good condition. Design, construction, location and size of food businesses facilities must be such as to enable proper maintenance, cleaning and / or disinfection, preventing or reducing air contamination, providing adequate working space that enables hygienic performance of all jobs

Hygienic sanitary facilities belong to auxiliary premises, which are used for sanitary hygiene and other needs of workers, such as wardrobes, bathrooms, washbasins, rooms for personal hygiene of women, toilets, food preparation rooms, periodical warming rooms and drying rooms, Cleaning and disinfection of work clothes.

Auxiliary rooms (wardrobes, bathrooms, washbasins, food storage rooms, rooms for personal hygiene of women, rooms for occasional warming of workers, toilets, urinal, cleaning and disinfection of work clothes and protective equipment etc.) are usually in special Buildings near workplaces or in an annex to the work premises. Auxiliary rooms may be located in buildings intended for workrooms if the nature of the process and the organization of work and the sanitary and hygienic conditions allow.

Hygienic sanitary facilities belong to auxiliary premises, which are used for sanitary hygiene and other needs of workers such as: wardrobes, bathrooms, washbasins, rooms for personal hygiene of women, toilets, food preparation rooms, periodic warming rooms and drying rooms, Cleaning and disinfection of work clothes.

Utility rooms (closets, bathrooms, sinks, storage facilities for food, rooms for personal hygiene of women, rooms for occasional warming workers, toilet, urinal, cleaning and disinfection work clothes and protective equipment, etc.). They are usually in separate buildings near jobs or in addition workspace. Auxiliary facilities may be located



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in buildings intended for work premises if permitted by the nature of the process and the organization of work and sanitary and hygienic conditions.

The auxiliary rooms must be designed and constructed to ensure the conditions laid down by the Construction Law and technical regulations for the performance of floors, walls, ceilings, roofs and other elements such as heating, ventilation, lighting, installation and the like, to workrooms. The auxiliary rooms are house in the facility in such a way as to provide daylight and ventilation, and at a distance of at least 30 m from the open storage facilities and the dump of materials from which the dust generated is manipulate.

Places of work must be arranging so that they have access to disabled persons, if necessary. This provision applies in particular to access roads, gates, passageways, staircases, showers, washbasins, toilets and workplaces directly used by handicapped persons and to places used by persons with disabilities as service users.

The size of the auxiliary rooms must correspond to the purpose, while the height depends on the purpose and the number of users, and cannot be less than 2.50 m. The auxiliary rooms can exceptionally have a height of less than 2.50 m but not less than 2.20 m, if these rooms are located in buildings that are not currently in use, the protected buildings that are cultural monuments and whose appearance, size and height cannot be changed, provided that the other norms prescribed for the auxiliary rooms

During the design, construction and reconstruction of additional facilities should be provided and install adequate water supply network for drinking water supply, sanitation and fire extinguishers, connected to the municipal water supply or at a special source in accordance with applicable regulations. Hygienic taps must be set for drinking water, the arrangement must be from the farthest positions not more than 100 m and not more than 60 people using one tap. The height of the stairs, if any, shall be 13 to 19 cm in the spaces intended for the auxiliary rooms and the width of the staircase 26 to 36 cm depending on their purpose. All stairs on the same staircase must be equal to the height and width of the stairs, and the deviations in the width of the stairs and in the altitudes of individual stairs shall not be more than 0,5 cm. Stairwells should not be slippery, and if there is a risk of slipping, it is necessary to place the material that is not slippery on the tread surface.

There should be a detailed presentation of the sanitary protection measures of the facility, equipment and products, with an attachment that makes the specification of all sanitary facilities that function as sanitary protection of the facility concerned.

Proper ventilation of the air as well as appropriate light must be provided in the sanitary facilities. Natural ventilation is permitted only in those auxiliary rooms where normal microclimate conditions exist and there is no formation and condensation of water vapor, high heat, harmful vapors, gases, fumes, fog and dust. When working and auxiliary rooms are ventilated naturally through windows or openings on walls and ceilings, they must be equipped with devices for easy opening and closing of the floor of the room

The number, size, arrangement and position of the natural ventilation opening shall be such as to ensure the modification of the air and microclimate conditions in the summer and winter period according to the norms laid down by the standard so that the number of air changes in the auxiliary rooms shall be provided within one hour as follows:

- For wardrobe and washbasin 1 change per hour.
- For the room for personal hygiene of the woman and occasionally to warm the worker 2 changes per hour.

- For bath 4 change per hour.
- For the bathroom 5 changes per hour.

### Changing rooms

An adequate wardrobe space for the staff must be provided in the food businesses premises.

Changing rooms are special rooms for civilian and work clothes and footwear and other personal items. Rooms for employees should not be opened directly in the production or other key areas. Most of the food regulations require separation of wardrobe space and the food businesses double doors. There must be room for changing workers (wardrobes), separate for men and women, which are connected to production facilities by a closed corridor. The dressing rooms must provide adequate ventilation, which allows one air exchange per hour.

As an exception to accommodate civilian and work clothes of workers can be used corridors or working areas, if the number of employees is less than 20, and if jobs are of such a nature that does not require the mandatory use of the bathroom. To accommodate the work clothes of workers who perform tasks with toxic and infectious substances, as well as with substances unpleasant and harmful odors, shall be provided and ensure that separate rooms that must be right next to the working areas in which these activities are performed. Regarding the location, wardrobe can be predicted as central or individual. Changing rooms and sanitary facilities must be located especially for staff working in the depot; in production facilities; on the collection and transport by-products of slaughter and offal; in the service of technical maintenance, service and transport at the premises for storage; veterinary inspection; in a lab; in an administrative building.

The wardrobe type and its equipment should be designed and carried out depending on 1. whether the clothes should be dry, 2. If the clothing should be ventilated, 3. If it is dirty work clothes or shoes, 4. If the wardrobe has a special guard or each user locks its / clothes, 5. If wardrobe is combined with another sanitary space.

The wardrobes can be made as: 1. dry wardrobes, 2. wardrobe washbasins, 3. separate wardrobes for civil and work clothes. Depending on the process of working in the wardrobe, they can be fitted in three ways: wardrobe with closets, wardrobe with wickets and hanger wardrobes.

The wardrobe needs to be designed, manufactured and equipped depending on the level of workplace occupancy and nature of the work carried out by the workers, according to the following criteria:

1. For clean jobs where normal hygiene conditions exist (Administrative rooms, Shops, Laboratory facilities,) wardrobes with wickets and hangers can be exported.
2. For the dirty work and jobs (Bakeries, Pastry shops, etc) in which dust is developed which is not highly harmful (poisonous) to human health, single wardrobes must be provided for the maintenance and maintenance of work and civilian clothing and footwear for persons at work.
3. For jobs in which dust, gases or vapors are highly detrimental to human health, workers at work must provide double wardrobes. If workers who do these jobs on a daily basis provide clean clothing, then the wardrobe closets for personal clothing can be single.
4. For work with humidity, and there is no danger to human health of dust, steam or gas (ice, foodstuffs, etc.), the wardrobe with the appliance must be provided to the persons at work; Workers who are exposed to moisture or water to the extent that their clothes cannot be dried for six hours, in wardrobes with ordinary wardrobes or in hanger lockers, must be made and installed devices that will allow complete drying of the clothes. For this purpose, drying chambers, warm and dry air circulation cupboards, etc. The temperature of the air drying clothes must not exceed 60°C.





Each employee must have a two-piece wardrobe, or cabinet of such a design, where he can keep separate work clothes and footwear from civilian clothing and footwear and hand tools. Wardrobe cabinets must meet the following requirements:

1. Made of metal, at least 150 cm high, 35 cm deep and 35 cm wide, designed to be 30 cm high for cleansing purposes and if they have no leg to be placed on a fixed foot 30 cm wall-mounted, and the roof surface inclined forward at an angle of at least 25° to prevent dust build-up.
2. Have ventilation openings at the bottom and the top with locking keys.
3. Are painted with protective coatings.
4. On the inside there is a built-in hanger or other suitable suiting means.
5. That in the upper part have a shelf for hat or hats, and the height of the shelf must be at least 30 cm from the top.
6. That in the lower part have a shoe shelf.

The double wardrobe can be divided in width into two parts. The couch in the double closet must be so designed that the personal clothes does not come into contact with the work.

Wardrobe cabinets and wardrobes should be deployed in the most convenient way to the length and width of the room and the position of the window and door so that a free passage is provided. If the premises provide for accommodation of clothes for more than 50 workers, then it must ensure the free passage width of at least 1 m.

The dressing rooms are fitted with dressing bench seats, which can be attached to cupboards or placed between the row of cupboards. Seats are made of materials that are easy to maintain hygienically.

For workers who perform tasks for which there is soiling, wetting the body and clothing, excessive sweating, the occurrence of large amounts of dust or odor, working with toxic, infectious or ionizing substances, as well as participating in the process of food processing or preparation of sterile materials, must be provided with bathrooms.

Bathrooms have to be designed and made especially for men, especially women, and have secured cold and hot water. Changing area should be separated so that suit workers not be exposed to splashing water. Bathrooms with showers must be in separate rooms, separated from space, which prevents sudden changes in air temperature and in cold period must be heated. The floor and walls of the bathroom must be of a material that is impervious to water and easily washable. Number of showers in the bathroom are determined depending on the type of work that workers perform and the number of employed workers in the most numerous shift as follows:

1. If there is heavy sweating, dust, harmful substances or unpleasant smells (e.g. Baking, Raw material transport, milling, Fish processing, etc.) when performing the work, ie there is a dewatering of clothing at a maximum of five workers.
2. If work is carried out on the processing of foodstuffs (e.g. Bread and pasta production, Meat products, etc.) or the production of sterile materials comes a shower on a maximum of ten workers.
3. If other work is done by body and clothing scouring comes a shower on a maximum of 20 workers Bathrooms with showers may be either shared or singular, but the surface of the cabin in which the individual shower set is not to be less than 0.90 m x 0.90 m. With the bathroom with open-type showers (shared bathroom) it is necessary to foresee a suitable premise that should be so designed and constructed that it is used to store clothing and footwear and to prevent sudden changes in temperature in the bathroom room. In the bathroom, every 10 shift workers are provided with a hand-washing equipment and one shower cabin.



Cabin with shower must comply with the following conditions:

1. The cabin walls must be covered with waterproof material of white or light-colored, and if the assembly must be made of stainless materials smooth and flat surfaces.
2. The cabin must have hot and cold water, soap and shampoo holder.
3. At the entrance to the cabin, the towel holder and the luggage compartment must be installed.
4. Floor area cab must have a corresponding decrease in the sink and must be covered with rubber or plastic mat.

In facilities where working women in jobs in which there is soiling, wetting the body and clothing, excessive sweating, the occurrence of large amounts of dust or odor, working with toxic, infectious or ionizing substances, as well as participating in processing of food products or making sterile substances, must be provided and provide special rooms for personal care of women with hot and cold water. Rooms for personal hygiene of women must be from another room separate from the space and equipped with special cabins of at least 1.50 m<sup>2</sup> and sinks for washing hands, and located close to the West, usually as close to the place of work.

Cabins are determined according to the number of working women, as follows: for every 50 women employed by one cabin to the 300 employed women, and on each additional 100 employed women still after one cabin. The cabin must be equipped with proper equipment to maintain personal hygiene (bidet, table, mirror, and sanitary waste bin for waste and supplier).

In facilities where the wardrobe away from the production premises must be toilets nearness of these rooms, separate them with the corridor and buffer room.

### **Toilets**

An adequate number of running water connections connected to an efficient drainage system must be provided in the food businesses premises. Toilets must not be placed directly in the rooms in which they operate with food. They are optimally located in the same facility or in the facility associated with the food businesses premises.

Toilets must be provided and secured specifically for men and women in particular and must be separate from the wardrobe and bathroom. In buildings the toilets must be provided on each floor. Distance to the toilet located in a premises where is the working spaces, from the farthest locations, must not be more than 100 m or greater than 200 m if the toilets are outside the building.

In facilities where wardrobes are remote from production facilities, there must be a restroom in the immediate vicinity of these rooms, separated from them by a corridor and a buffer room. In the toilet area, the required number of hand washing equipment must be set. The door at the entrance to the toilets area must be mechanically closed and have water wash system and pedal eluent.

Toilets must be provided in special cabins with a height of at least 2 m in height, measured from the floor. The floor area of the cab shall not be less than 0.90 x 1.20 m. The number of toilets in the building, in which the working rooms are determined, is determined by the number of employees employed. In the toilets it is necessary to provide for the number of workers of the same sex an adequate number of toilet bowls: 1 toilet bowl for 1 - 15 workers 2 toilet bowls for 16 - 35 workers 3 toilet bowls for 36 - 55 workers 4 toilet bowls for 56 - 80 workers and furthermore, one toilet bowl for every 30 workers over 80. Male sachets in male baths, up to one third of the total number of shells, can be replaced by urinals, which must be placed in a separate part of the toilet.

The toilet room must be equipped with one washbasin for up to four toilets.



The toilets must have adequate ventilation to ensure 4 air changes within one hour. Each toilet must have doors closing from the inside. In addition to the main equipment of the toilet, which consists of shells and water washers, it is necessary to equip the toilet cabinet with a box or toilet paper and a wall hanger or wedge. Urns can be made as a panel urinal, a seashell and an upright urinal.

Urinals must be made from materials that are easy to wash. The length of the urinal panels must correspond to the number of workers employed, in order to secure a wall length of 60 cm for a maximum of 30 workers. Urinals panel representing the level of the wall must be made of a material resistant to the urine and flushing water must have the entire length. The drainage drain must be placed below the floor level and must have a slight fall towards the drain.

Because of the possibility of contamination of sanitary facilities for visitors are separated from the working space and auxiliary rooms for workers. Sinks and toilets, especially for men and especially for women, must be carried out as required for personnel and have the right equipment for washing hands.

### **Hand Washing Facilities**

In the Ordinance on Food Hygiene (OG 99/2007), Annex II, Chapter I, one of the general requirements for food businesses facilities listed under point 4 reads as follows:

An adequate number of hand washing basins must be provided at suitable locations. Hand wash basins must have warm and cool running water, hand washing and sanitation. If necessary, food washing equipment must be separated from hand-washing equipment.

Food businesses premises must have hand washing equipment (washbasins) located so that food-handling staff can easily use them. Acceptable and accessible hand-washing equipment enables and encourages those who handle food to use them. Washbasins (or other equipment) that are placed behind or shielded by other equipment, walls, parts or entrance doors will probably be unacceptable for use. Washbasins placed above or below work desks can be set too low or too high to be acceptable. In such situations, access to the wash basin may be awkward, and such setup does not meet the standard.

The number of washbasins required to maintain good hygiene in the facility in the food businesses depends on the number of employees, the nature and location of the jobs to be performed. Basins are generally housed in separate rooms connected with the wardrobe, especially for men, and especially for women. The position of the wash hand basin should be close to the toilets, the entry points in the food and work premises, to ensure that the workforce will wash their hands after using the toilets, before entering the premises in which they operate with food and during the business with food.

Washbasin for cleaning and washing of food must not be used for hand washing, or vice versa

Adequate facilities for handwashing and drying should be provided wherever the process demands. In particular, a suitable number of basins or troughs should be sited at the entrance of food rooms to ensure all persons entering wash their hands. Wash-hand basins must be easily accessible and should not be obstructed. They must be kept clean and maintained in good condition. Non-hand operated spray taps providing warm water at 35° -to 45° are essential to minimize the risk of cross-contamination. Washing facilities provided in food rooms should be additional to those used in conjunction with sanitary accommodation. All basins and troughs, preferably made of stainless steel, should be connected to drains by properly trapped waste pipes.

Where appropriate, adequate facilities for the cleaning and disinfection of utensils, crockery, cutlery, glasses and equipment should be provided. These facilities should be constructed of corrosion-resistant materials, normally

stainless steel, capable of being easily cleaned. Twin sinks are preferable to facilitate washing and disinfecting/rinsing. Sinks should be provided with adequate supplies of hot and cold water. Mixer taps are acceptable. Taps should be wall-mounted with no direct connection to the sinks. It is good practice to provide facilities for draining and air drying equipment close to the area where it is washed. Waste pipes should be plastic push-fit ware. Sinks should be freestanding so that they can be removed easily after unscrewing the lower trap joint freeing the waste pipe. "Sterilizing" sinks and units should be capable of operating at 82°C (as should the rinse cycle of dishwashing and tray-cleaning machines. It is recommended that if any of the above are positioned against the wall, a suitable stainless steel upstand of 300mm, or a splash back, be provided. If glasswashers are used, they should clean and disinfect. Hoses and other equipment for cleaning and disinfecting fixed equipment may be required.

Separate sinks must be provided for food preparation and equipment washing if the volume demands it. In small operations the same sink may be used if there is no risk to food safety. Exclusive food sinks may be provided with cold water only. It is good practice to have signs above sinks indicating their use.

All new premises should be provided with adequate staff sanitary accommodation in accordance with the Workplace (Health, Safety and Welfare) Regulations, 1992 and the approved Code of Practice and Guidance L24. Suitable and sufficient sanitary conveniences must be provided at readily accessible places, in adequately ventilated and lit rooms that are kept clean and tidy. Rooms containing sanitary conveniences must not communicate directly with a room where food is processed, prepared or eaten. Internal wall and floor surfaces should permit wet cleaning.

Non-hand operated flushing devices are recommended. Doors to intervening spaces and sanitary accommodation should be self-closing and clearly illustrate the sex of the user. It is good practice to display a conspicuous notice requesting users of the toilet to wash their hands before leaving. Suitable and sufficient washing facilities must be provided at readily accessible places. In particular, facilities must be provided in the immediate vicinity of every sanitary convenience and supplied with clean hot and cold or warm water, liquid soap, nailbrushes and appropriate drying facilities.

## **Canteen**

Adequate space must be provided for staff to access dining and serving areas. These areas must be designed in accordance with the standards that ensure high hygiene practice and insurance of contamination on minimum risk.

The requirements for floors walls and ceilings specified below apply to the floors, walls and ceilings of all areas used for food handling, cleaning, sanitizing and personal hygiene within a food businesses except in the dining areas. Carpet is permitted in dining areas but is inappropriate in food preparation or storage areas.

Sufficient dining space, allowing 1m<sup>2</sup> per person for dining area; Area of food preparation premises to suit: kitchen incorporating crockery, equipment, chemical, food storage, washing areas, wet and dry preparation areas, refrigeration and cooking areas. Separation of raw products and cooked final products, Sanitary conveniences for both staff and visitors; Space for change-rooms and storage area for personal items; Cleaning storage for cleaning equipment, chemicals and cleaner's sink. The tables should be completely cleared and cleaned between two usages. Seating and sanitary accessory: soap, hand drying equipment, washbasin, toilets etc. should be in sufficient quantities, depending on the number of workers. Canteen areas are not required to meet the same requirements for floors, walls and ceilings as food preparation areas, but adequate space must be provided for staff to access dining and serving areas.

Canteen areas must be ventilated by natural or mechanical methods in accordance with the food premises.

Food premises should have sufficient natural or mechanical ventilation for extraction of fumes, smoke, steam, heat and condensation arising from the food premises, and supply of fresh air thereto. A mechanical ventilating



system should be provided to give not less than 17m<sup>3</sup> of outside air per hour for each person if natural ventilation is insufficient.

Ventilating systems in factory canteens should be kept fully in operation at all times when the premises are open to the public. Periodic checks to ventilating systems should be conducted to ensure proper functioning.

Ventilating systems in restaurants and factory canteens should be inspected at intervals not exceeding 12 months by registered specialist contractor in accordance with the law and hygiene standards and practice.

Air filters, grilles of ventilating systems should be removable for cleaning, and be cleaned regularly to prevent accumulation of dirt and dust. Filters should be cleaned by water and detergent, or be replaced, when the filter flag indicator shows “dirty”.

Cooking range inside kitchens and food rooms should be equipped with an exhaust system that can efficiently and effectively remove all fumes, smoke, steam or any vapor arising from food operations.

The exhaust system should be installed with a metal hood properly connected to an air-duct fitted with an extraction fan of sufficient capacity. All exhaust should be arranged to pass through a grease filter and, if required, an air pollution control equipment (e.g. a water scrubber or electrostatic precipitator) before being discharged into the open air in such a manner and at such a position as not to be a nuisance.

Fresh air supply system fitted with propulsion fans with adequate capacity should be installed in food rooms and kitchens.

Adequate supply of clean and quality fresh air to food premises is important for preventing contamination of food and equipment and for the good health of the employees. Unclean air, dust, odors, condensation and grease are all essential sources of food and air contaminants, excessive accumulation of which will not only cause harmful effect to the health of employees, but also pose a fire hazard.

If solid fuel or diesel oil is used, all smoke should be discharged through a chimney above the roof level.

Double or other types of doors leading from the dining room to open allowed only if the kitchen and all other areas of food preparation suitably protected from external contamination such as insects and dust.

Lighting in canteen areas can be able to be dimly lit when open to the public, but the premises must have supplementary lighting in these areas to allow for cleaning by staff and inspection for pests.

## Chapter 4

### REFRIGERATED FACILITIES

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#### Chapter Objectives

- To present the specificity of refrigerated facilities in the context of agri-food industrial establishments
- State the basic aspects that should be taken into account when defining refrigeration needs in an agri-food industrial establishment
- State the requirements to meet in the sharing of refrigerated air between refrigeration chambers and freezing chambers

#### General Principles

Cold storage facilities shall be designed and constructed as to be capable of reducing all food at the required storage temperature in the ideal timeframe and / or maintaining stored food at or below that temperature, minimizing the likelihood of contamination.

In the design and construction of cold storage facilities, it should be ensured that:

- Refrigeration plants are designed for the maximum possible processing and storage capacity at any time.
- Condensation on products or equipment is minimized.
- Temperature monitoring and indicating devices operate whenever these facilities are in use.
- The temperature sensors are located in order to allow a correct monitoring of the temperature range of the cold unit at various points. If only a temperature sensor is used this should be located at the return point of the airflow of the evaporation unit because that is where the highest temperature is normally found.
- Shipping areas are designed and constructed to ensure environmental conditions capable of protecting food from environmental hazards and to ensure that food temperatures are maintained during loading and unloading.
- The protection of unprotected (unpackaged) food must include loading and unloading docks or shipping areas that can be completely isolated from the outside.



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## Processing Rooms

The performance of refrigerated operations is also a food safety requirement when dealing with a wide range of products more susceptible to microbial attack, namely by pathogenic microorganisms. Thus, processing rooms must be designed and constructed in such a way:

- To maintain the atmosphere of the processing rooms in accordance with the required temperature requirements taking into account the raw materials and products handled there;
- Ensure that temperature control of temperature processing rooms is monitored with calibrated equipment and with automatic temperature recording. The temperature should be recorded at intervals not longer than one hour.

## Refrigerated Cold Stores

Refrigeration cold stores should be designed and constructed with the same basic principles in mind, namely:

- Food storage refrigeration facilities must be designed and constructed in such a way as to allow exposure / maintenance of the food surface or thermal center, as appropriate, to reduce or maintain the appropriate temperature of the food and the process.
- The temperature of the refrigeration cold stores should be monitored by calibrated automatic temperature recording equipment. The temperature in the room should be recorded at intervals not exceeding one hour.
- Food refrigeration facilities should be designed and constructed to allow food to be reduced in time and in accordance with process and food.

## Frozen Cold Stores

In the frozen cold stores, the products are stored at a negative temperature, being the basic principles the following:

- Frozen cold stores must be designed, constructed and operated in such a way that they ensure that frozen food is kept at a temperature below - 15°C or less during storage and its placement.
- The temperature of these cold stores should be monitored by calibrated automatic temperature recording equipment. The temperature should be recorded at intervals not exceeding four hours.

## Refrigerated Air Sharing

Refrigeration cold stores and quick-cooling cells using the same supply of refrigerated air to the frozen cold stores shall comply with the following requirements:

- Frozen cold stores must be physically separated from refrigeration chambers and quick-cooling cells by walls from floor to ceiling.
- Insulation must be adequate in order to minimize the transfer of heat between the chambers and the chillers and the chambers.
- When a refrigeration cold store or a quick cooler is used to cool unprotected food, air entering the freezer compartment, if used to store packaged food, must be adequately filtered to remove dust and contaminants before entering cold store or in the quick-cooling cell.

- The exhaust air from the cooling chamber or the quick cooler cell must not be released again directly into the freezing chamber and must be handled by one of the following techniques: **i)** Discharged directly into the outside environment; **ii)** Led directly to the air intake of the evaporating unit of the freezing chamber; **iii)** Reduction to the temperature of the refrigerating chamber through a heat exchanger before entering the freezing chamber again.
- The cooling capacity of the freezer compartment must be adequate at any time to meet the maximum storage requirements and the additional refrigeration requirements associated with the cold stores and the quick-cooling cells.







## Chapter 5

### CONSTRUCTION, MAINTENANCE AND MODIFICATION OF FOOD PREMISES

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#### Chapter Objectives

- To present the specificity of design and construction of food premises
- To present general law requirements, maintenance and modification for food premises
- Present storage facilities
- Present inspection of food premises
- Present risk factor assessment of food premises

#### General Requirement

Food businesses operators shall ensure that all stages of production, processing and distribution of food under their control satisfy the relevant hygiene requirements according to the applicable laws. Food businesses operators carrying out any stage of production, processing and distribution of food shall comply with the general hygiene provisions laid down specific hygienic requirements for food premises. Food premises must be constructed and designed in a way to ensure this law requirement. For that reason, Food businesses operators shall, as appropriate, adopt following specific hygiene measures:

- Compliance with microbiological criteria for foodstuffs.
- Procedures necessary to meet targets set to achieve the objectives of this specific law requirement.
- Compliance with temperature control requirements for foodstuffs.
- Maintenance of the cold chain.
- Sampling and analysis.

### LEGISLATION AND APPROVAL OF PLANS

Food businesses operators shall cooperate with the competent authorities in accordance with other applicable Community legislation or, if it does not exist, with national law.



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In particular, every food businesses operator shall notify the appropriate competent authority, in the manner that the latter requires, of each establishment under its control that carries out any of the stages of production, processing and distribution of food, with a view to the registration of each such establishment.

Food businesses operators shall also ensure that the competent authority always has up-to-date information on establishments, including by notifying any significant change in activities and any closure of an existing establishment. However, food businesses operators shall ensure that establishments are approved by the competent authority, following at least one on-site visit, when approval is required under the national law of the State in which the establishment is located.

The design and construction of food premises must:

- Be appropriate for the activities for which the premises are used.
- Provide adequate space for the activities to be conducted on the food premises and for the fixtures, fittings and equipment used for those activities.
- Permit the food premises to be effectively cleaned and, if necessary, sanitized.

The layout, design, construction, siting and size of food premises must be designed and constructed in a way to ensure:

- (a) Permit adequate maintenance, cleaning or disinfection, avoid or minimize air-borne contamination, and provide adequate working space to allow for the hygienic performance of all operations.
  - (b) Be such as to protect against the accumulation of dirt, contact with toxic materials, the shedding of particles into food and the formation of condensation or undesirable mould on surfaces.
  - (c) Permit good food hygiene practices, including protection against contamination and, in particular, pest control.
  - (d) Where necessary, provide suitable temperature-controlled handling and storage conditions of sufficient capacity for maintaining foodstuffs at appropriate temperatures and designed to allow those temperatures to be monitored and, where necessary, recorded.
1. An adequate number of flush lavatories are to be available and connected to an effective drainage system. Lavatories are not to open directly into rooms in which food is handled.
  2. An adequate number of washbasins is to be available, suitably located and designated for cleaning hands. Washbasins for cleaning hands are to be provided with hot and cold running water, materials for cleaning hands and for hygienic drying. Where necessary, the facilities for washing food are to be separate from the hand-washing facility.
  3. There is to be suitable and sufficient means of natural or mechanical ventilation. Mechanical airflow from a contaminated area to a clean area is to be avoided. Ventilation systems are to be so constructed as to enable filters and other parts requiring cleaning or replacement to be readily accessible.
  4. Sanitary conveniences are to have adequate natural or mechanical ventilation.
  5. Food premises are to have adequate natural and/or artificial lighting.
  6. Drainage facilities are to be adequate for the purpose intended. They are to be designed and constructed to avoid the risk of contamination. Where drainage channels are fully or partially open, they are to be so designed as to ensure that waste does not flow from a contaminated area towards or into a clean area, in particular an area

where foods likely to present a high risk to the final consumer are handled.

7. Where necessary, adequate changing facilities for personnel are to be provided.
8. Cleaning agents and disinfectants are not to be stored in areas where food is handled.

Design and construction of food premises must satisfy Specific requirements in rooms where foodstuffs are prepared, treated or processed (excluding dining areas and specific premises specified by national law).

1. In rooms where food is prepared, treated or processed the design and layout are to permit good food hygiene practices, including protection against contamination between and during operations. In particular:
  - (a) Floor surfaces are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect. This will require the use of impervious, non-absorbent, washable and non-toxic materials unless food business operators can satisfy the competent authority that other materials used are appropriate. Where appropriate, floors are to allow adequate surface drainage;
  - (b) Wall surfaces are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect. This will require the use of impervious, non-absorbent, washable and non-toxic materials and require a smooth surface up to a height appropriate for the operations unless food business operators can satisfy the competent authority that other materials used are appropriate;
  - (c) Ceilings (or, where there are no ceilings, the interior surface of the roof) and overhead fixtures are to be constructed and finished so as to prevent the accumulation of dirt and to reduce condensation, the growth of undesirable mould and the shedding of particles;
  - (d) Windows and other openings are to be constructed to prevent the accumulation of dirt. Those which can be opened to the outside environment are, where necessary, to be fitted with insect-proof screens which can be easily removed for cleaning. Where open windows would result in contamination, windows are to remain closed and fixed during production;
  - (e) Doors are to be easy to clean and, where necessary, to disinfect. This will require the use of smooth and non-absorbent surfaces unless food business operators can satisfy the competent authority that other materials used are appropriate;
  - (f) Surfaces (including surfaces of equipment) in areas where foods are handled and in particular those in contact with food are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect. This will require the use of smooth, washable corrosion-resistant and non-toxic materials, unless food business operators can satisfy the competent authority that other materials used are appropriate.
2. Adequate facilities are to be provided, where necessary, for the cleaning, disinfecting and storage of working utensils and equipment. These facilities are to be constructed of corrosion-resistant materials, be easy to clean and have an adequate supply of hot and cold water.
3. Adequate provision is to be made, where necessary, for washing food. Every sink or other such facility provided for the washing of food is to have an adequate supply of hot and/or cold potable water consistent with the requirements of appropriate law and be kept clean and, where necessary, disinfected.



Documentation must reflect those needs. It is a complex document that can serve a wide variety of purposes, as directory for general use, and reference document for use in formulating tender specifications.

The complexity of design and construction of food premises policy derives from the need to reconcile four different factors:

1. Economic interests, looked after by administrators and executives who must ensure that budgetary procedures are correctly followed.
2. Technical interests, the responsibility of specialists, who must correctly assess the quality of technical services and conformity with technical and safety standards.
3. The interests of the users for whom the building is intended, who are entitled to an acceptable level of comfort and safety.
4. Environmental interests.

Food premises legislation can be categorized according to the various stages of the building process from planning to use, namely:

- Urban development legislation (Planning permission and environmental licences).
- Architectural legislation (Architectural design, structural calculations for the building shell).
- Legislation governing technical installations (Dimensions, energy consumption).
- Legislation on health and safety at work.
- Environmental legislation.

Standards are categorized according to the issuing body and the technical domain to which they relate.

## MAINTENANCE OF FOOD PREMISES

Generally, it is important that food premises, fixtures, fittings and equipment are maintained in a good state of repair and working order so that they do not potentially compromise food safety and suitability.

All eating and drinking utensils used in food handling or serving are not chipped, broken or cracked, because then they cannot be effectively cleaned or sanitized and there is a higher risk of food becoming physically contaminated.

It is important that premises are maintained to prevent pest ingress and egress and to prevent physical contamination of food. This can be achieved by ensuring:

- There are no holes in walls, floors, ceiling, fixtures and fittings that will allow for pests to enter or harbor.
- There are no holes in window and door screens that will allow pest ingress & egress.
- That there are no exposed wooden or chipboard surfaces.
- There is no flaking paint especially around food preparation areas.
- Coving is well sealed to the walls to prevent pest harbourage.
- Shelving maintains its integrity (No rusting metal and exposed wood).

Prior to undertaking any works at a proposed food premises or at an existing food premises, it is recommended that approval be obtained from authorized local authority Council.

When submitting plans for approval, they should be drawn precisely to a scale of not less than 1:100 and include:

- Details of the proposed layout of the premises showing the position of all benches, appliances, equipment, counters and other fixtures.
- Specifications which list all materials to be used, finishes to floors, walls, ceilings, cupboards and work benches and details/descriptions of all equipment to be used.
- Information relating to the types of food involved, the nature of work to be carried out in each area and the number of proposed employees.

Where mechanical ventilation is required additional plans must be submitted which include:

- A fully dimensional drawing showing end and front elevation.
- Details relating to the filter capacity, rated motor power and provision for make up air.
- Details showing the flue and flue height.

## **Storage Facilities**

Storage facilities are important auxiliary premises that must be secured in food handling business. Depending on the type of business, that can be enclosed spaces or rooms located outside or inside the building. Food handlers must provide storage facilities for raw materials, packaging, finished products, temporary storage of solid waste, storage of equipment and cleaning equipment, and for other purposes depending on food business activity. Design and construction of Storage facilities must be according to law same as all other part of building.

Storage facilities must be located where there is no likelihood of stored items contaminating food or food contact surfaces.

- For dry goods and food packaging materials Adequate storage must be provided in a sealed and lined, pets-proof room with floor according to standard.
- Chemicals, cleaning equipment, pest control chemicals and equipment must be enclosed in cupboards located away from the preparation and storage of food, designated for that use only, where there is no likelihood that stored items contaminating food or food contact surfaces.
- Adequate facilities must be provided for staff to store personal belongings that consist of change room, or enclosed cupboards for the storage of clothing and personal belongings, located away from the food preparation and storage areas.
- Storage of paper and other materials associated with the administration of the business must be stored in a room designated for that use or in enclosed cupboards or drawers designated for that use, separate from food preparation and storage areas.

## **Storage of Rubbish and Recycling Materials**

Food premises must have facilities for the storage of rubbish and recycling materials adequate to volume and type of refuse, include an external area or a refuse room specifically for the storage of waste containers that is enclose the refuse, and must be design to prevent access by pests and easily and effectively cleaned.



### **External and recycling storage areas must be:**

- Paved with an impervious material.
- Grated and drained to the sewer.
- Able to be easily cleaned.

capable of storing the rubbish generated from the businesses, e.g. wet waste, cardboard and general dry wastes, bulk waste oil, without creating the risk of providing a potential shelter area for pest. Great attention must be given to the location of waste storage areas and to their potential influence on environment. Any external waste storage areas are to comply with the relevant waste laws. External refuse and recycling storage areas must be covered and provided with a hose and tap connected to a water supply. Rubbish rooms must be designed to minimize all kind of nuisance.

### **Rubbish and Recycling Containers**

Must be constructed of an impermeable material such as metal or plastic, with tight fitting lids. They must be maintained in a good condition to prevent the access of pests. If garbage shafts are installed in food premises, they must be constructed of impervious durable material, and comply with the relevant waste laws. Bins that cannot be lifted for cleaning are to have drainage bungs at the base. If rubbish rooms are installed in food premises, they must be designed and constructed in way that:

- Must be secured from the entry of the pest.
- Must be constructed of a solid material with a cement rendered or steel trowelled finish to a smooth surface.
- Floors and walls must be from impervious material and coved at the intersection.
- The floor must be grated and drained to an approved floor waste and connected to sewer in an approved manner.
- Ventilated can be by natural or mechanical systems. If mechanical ventilation is used, it must comply with national law, fitted with a hose and tap connected to the water supply.

Rubbish bins must be cleaned regularly to remove the food scraps stuck on the bin surface and to minimize the contamination and odor that attracts insects and pest. Bins may be cleaned by the rubbish collecting contractors or inside a rubbish room constructed to the specific requirements in accordance with applicable law.

### **Storage of Waste**

Food premises must provide appropriate facilities and plumbing infrastructure to ensure that sewage and all wastewater generated are disposed appropriately according to law, and to avoid any contamination for the food, or the environment. The food premises must be designed in accordance with the national and local law.

The design and installation of sanitary plumbing and drainage must comply with national law and be approved by your local authority. Grease traps play an important role in preventing solids and greasy waste from entering the sewerage system. They are designed to intercept and retain silt, sand, oil, grease, sludge and other substances. The use of grease traps protects both the internal pipes at a property, as well as the main sewage infrastructure. Installation and maintenance of a grease trap designed to filter grease and oil generated from the food business operations is required and must be in accordance with local water authority. Locating grease traps in food preparation areas can result in contamination problems when the traps are emptied or in the event of overflow, and should therefore be located outside the food preparation area and preferably outside the building. Wastewater generated from rubbish

bins, cleaning bins and other cleaning activities must be disposed of in a cleaner's sink or via other approved facility. Access openings to the sanitary drainage system and grease traps must not be located in areas where there is a risk of food contamination. All access points to grease arrestors must have a tight fitting lid that will not buckle, warp or rust to prevent the entry of pests. A food premises may utilize an approved drainage system for external waste storage to dispose of contaminated liquid waste. To allow effective floor cleaning procedures, cold rooms should have an external floor waste drain located near to the door. Equipment generating liquid waste must be connected to an approved standish for correct discharge, e.g. cold room evaporator units or liquid holding hot boxes or removed in some other approved manner. Storage of waste must be designed and constructed to avoid cross-connections and backflow that may contaminate the potable water supply.

## INSPECTION OF FOOD PREMISES (CHECKLIST) AND REGISTRATION

Food business required by law for to comply with all food safety regulations. This affect how you build or style your business as well as how food is handled when the establishment is in operation. You also need to develop a Food Safety Program based on HACCP principles. This document needs to be updated regularly and must be kept on the premises of the food businesses.

Before businesses starts operating, the proprietor must contact the competent authority to arrange a final inspection by an appropriate Inspection Officer. Upon approval, an application for registration must be completed and submitted to competent authority.

Food businesses may be required to have Food safety programs under state or territory food legislation. Food businesses should check state or territory requirements with their local council or state, or territory health department and check all document they need.

A food safety program is a written document indicating how a food businesses will control the food safety hazards associated with the food handling activities of the businesses. In some case only high-risk food businesses are required to have food safety programs. The size, scope and documentation which must be included in this program depends on the type and risk of carrying the food businesses for which approval is require. Food Safety Program could be audited at any time and if proprietor is not complying with all food laws and regulations, then could be fined or face more severe punishment. Some of these requirements apply to all food businesses, and some are specific to the particular food product.

- All food businesses must be registries with their local Council or the appropriate authority in their state or territory.
- The layout of premises must minimize opportunities for food contamination (e.g. raw food separated from processed food)
- Essential services and equipment must be available such as hand washing facilities and adequate chilled storage space
- Overall accountability for the safety of products sold by a business lies with the owner of the business: it is their responsibility to ensure no one of their premises contaminates food
- Food businesses may be required to have Food safety supervisors, who is certified by a registered Training Organization



Extra food hygiene precaution should be used when handling high-risk foods, such as ready- to-eat or cook chill product and design and construction of premises must meet those requirements.

All Requirement of Code must be fully filled as a:

- That potentially hazard food must be stored at 5°C or below, at 60°C or above, or at another temperature for a limited time, must be shown that there is adequate storage space that can be show that food is safe.
- Must have effective cleaning and sanitation program to maintain and adequate level of hygiene in food handling or process environment.
- An effective pest control program must be in place to prevent pests' contaminations.
- Food handler must have food safety and hygiene skills and knowledge according to their work duties.
- Food handler experiencing symptoms of a foodborne illness or know to be suffering from a foodborne illness must not handle food, they must have confirmation from the doctor that they are no longer suffering from a foodborne illness.

Before opening food business must an authorized officer carrying out a food standards inspection and interventions as outlined in the food law code of practice looks at quality, Composition, Labelling, Presentation, Advertising of food and the materials and articles in contact with food.

Once approval of plans has been given, and all other necessary approvals and permits are obtained, construction work can commence. An inspection of food premises must occur prior to opening. It is food handler responsibility to request this inspection.

Application for registration must be made prior to the pre-opening inspection.

#### **Checklist - (Prior to opening new premises)**

1. Plans submitted for approval with notification form.
2. Approval received.
3. Application for registration submitted with payment.
4. Food Safety Program submitted with copy available at premises (Depends of authority).
4. Food Safety Supervisor certified or enrolled in course (Depends of authority).
5. Probe Thermometer available on premises for temperature checks.

#### **Checklist for starting up (One example)**

- Do the design and construction of your premises meet legal requirement?
- Are you aware of the main General Food Law Requirements?
- Do you keep written records of all the suppliers that provide you with food or any food ingredients?
- Have you put food safety management procedures in place and are you keeping up-to-date records of these?
- Do you and your staff understand the principles of good food hygiene?
- Have you considered health and safety and fire safety arrangements?



- Have you registered as self-employed?
- Do you need to register for VAT?
- Are you keeping records of all your business income and expenses?
- Are you keeping records of your employees' pay and do you know how to pay their tax and National Insurance contributions?
- Do you describe food and drink accurately?
- Do you need to apply for a license to sell alcohol, for entertainment, for selling hot food and drink late at night, or selling food on the street?

## RISK FACTOR ASSESSMENT OF PREMISES

All food handlers according to the law are obliged to:

- Ensure that design and construction of food facilities are suitable for activities for which the premises are used.
- Take all practical measures for processing and producing only safe and convenient food.

When evaluating proposals for a new job food that intends to produce food inspections should take into account:

- Design and construction of the premises to be used.
- Type of foods to be prepared.
- Risk posed by the preparation of these foods.

In determining the suitability of the food premises should be considered requires that premises are:

- Appropriate for the purposes which they are used.
- Provide adequate space for food production and equipment.
- Facilitate cleaning, Sanitizing and maintenance.
- Prevent access by and shelter of pests.
- Keep out dust, dirt, fumes, smoke and other contaminants.

Standard design and construction must reflect the risk arising from the operation of food companies and different risk categories of food businesses. The requirements of the standard are quite different when in food business involved only low risk food from high risk food. It is necessary that inspection assess all premises on their production and design, same as that food business give Risk classification of food manufacturing activities.

It should be noted that inspections must take into account the risk arising from the activities of food production of any proposed food business, but it is necessary to assess compliance inspection requirements based on the results of Low and inspections in the food business.

High risk activities include the production of:

- Dairy products, such as cheese, yoghurt, ice cream, custard.
- Protein-based food including fish, meat, chicken and seafood.
- Food that requires temperature control, including cakes with high moisture content or with cheese icing, sorbet,



sushi, sandwiches, pastries, mustard, pesto, soups and desserts.

- Food products where ingredients are not heat treated or where the product pH is greater than 4.6 which would require refrigeration once they are opened (Cakes with some sauces, marinades, syrups, and salad dressings)
- Food recipes that require the use of food additives.

**Medium risk activities include the production of**

- Home-made chocolates.
- Seeds and spice mixes.
- Dehydrated chillies.
- Fruit leather, dry fruit slices.
- Cooking oils, including olive oil.
- Infused oils where fresh herbs, spices or vegetables are used as part of the finish product.

**Low risk activities include the production of**

- Jams and marmalades.
- Flour-based products such as biscuits, shortbread, scones, buns, muffins and cakes which do not contain potentially hazardous foods such as cream.
- Nougats, fudges, meringues, Turkish delights.
- Spices and spice mixes including dry curry powders if ingredients are purchased from an approved food business.
- Pickled onions.
- Herb vinegars with a pH of less than 4.5.
- Chutneys, relishes and sauces that are heat treated by boiling or cooking.
- Food activities such as cake decorating, repacking of bulk packaged low risk confectionery products.
- Low risk activities may become high risk activities, if food recipes require food additives.

It is an obligation for all food businesses to provide relevant and accurate documentation to Inspection how compliance assessment can be made, otherwise the inspection will not be able to assess the conformity of production and legal obligations. As part of any food business registration approval process, inspection officers could request the following information from food businesses:

- Detailed recipes (including quantities of ingredients used).
- Detailed manufacturing process explanations with temperature and time used for each cooking steps.

**Information on:**

- Food storage.
- Cleaning procedures.
- Product shelf life determination (recommended to be done by accredited laboratory).
- Product labelling.

- Food recall procedures.

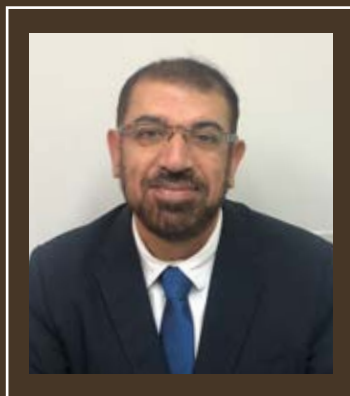
And all other information necessary to determine the risk by the food business and whether the food business will be able to comply with the requirements of the Law. The food business should also be able to demonstrate that the food produced will be safe and suitable for human consumption. Microbiological testing can assist a food business with this. The types of tests and exactable limits, and all other necessary testing that should be carried out are listed in Codex or national Law. If the food business is subject to a regulatory requirement to implement and manage a food safety program or management system, inspection should verify the program meets all prerequisites before approval for the business.



## Bibliography

1. A Guide to the Food Safety Standards, Second Edition, January 2001, Australia New Zealand Food Authority Safe Food Australia, [https://www.foodstandards.gov.au/publications/documents/3\\_2\\_3](https://www.foodstandards.gov.au/publications/documents/3_2_3).
2. Canadian center for occupational health and safety. Food Service Workers Safety Guide. 5<sup>th</sup> Edition.2005. 1-139. <http://www.ehs.uconn.edu/forms/TTT/fwsg.pdf>.
3. Er. B Sreenivasula Reddy. Food plant design and layout. Acharya N.G. Ranga Agricultural University. College of Food Science and Technology, Chinnarangapuram, Pulivendula - 516390 YSR (KADAPA) District, Andhra Pradesh.
4. Food Standard Agency, Food hygiene - a guide for businesses, website: [food.gov.uk](http://food.gov.uk)
5. Food Safety and Inspection Service. US Inspected Meat and Poultry Packing Plants, A Guide to Construction and Layout. [www.fsis.usda.gov](http://www.fsis.usda.gov).
6. Food Safety Standard (Food Premises and Equipment). The Australian Standard 4674-2004 (Design, construction and fit-out of food premises).
7. Food Premises Design and Fit-out Guidelines Australia. Public Health Unit 293 Springvale Road, Glen Waverley 3150.
8. Guidelines for Food Premises Design and Equipment Australia and Newzealand, Health Services Department 44 Turnham Avenue, Rosanna 3084. <http://www.foodstandards.gov.au/Pages/default.aspx>.
9. John Holah, H.L.M. Lelieveld (2011). Hygienic Design of Food Factories, Woodhead Publishing Limited.
10. Paul Singh. Introduction to Food Engineering. 2<sup>nd</sup> edition, Springer.
11. Public Health Unit, Food Premises Design and Fit Out Guidelines, 2010, pp 1-22.[www.monash.vic.gov.au](http://www.monash.vic.gov.au).
12. R. H. Schmidt, D. J. Erickson, Sanitary design and construction of food processing and handling facilities (2005, renew 2008) <http://edis.ifas.ufl.edu/fs120>
13. Recommended International Code of Practice General Principle of Food Hygiene, CAC/RCP 1-1969, Rev. 4 (2003).
14. Washington Department of Labor and Industries, Safety and Health Assessment and Research for Prevention (SHARP) Program, pp 1-49, 2001. Washington, USA. [www.LNI.wa.gov/sharp](http://www.LNI.wa.gov/sharp)





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