DESIGN AND CONSTRUCTION

The appropriate design and construction of food premises and equipment assists retailers to maintain high standards of food safety, effective production and serving procedures. A well-designed store enables different work activities to be kept apart and makes it easy for staff to clean, work effectively, support effective storage and cut down on waste - all important in the success of running a business. In South Africa the design and construction must comply with national and local building regulations and the Health Act.

Proper design and layout of the food preparation area results in a positive contribution to good food hygiene. Staff generally respond well to good working conditions and take more pride in their work and work environment.

Potential hazards

- Bacterial contamination - when there is a harbourage for bacteria and/or food pests.
- Cross-contamination - the process by which bacteria or other micro-organisms are unintentionally transferred from one substance or object to another, with harmful effect. For example, when the same surfaces and equipment are used for raw and high-risk foods and are not properly cleaned.
- Physical contamination - foreign bodies are objects such as hair, pieces of plastic/metal that can occur as contaminants in food e.g. nuts, bolts, glass or other items fall from machinery, equipment or light fittings.
- Chemical contamination - Presence of unwanted substances that makes air, water, soil, or food unfit for consumption or use. For example, when an incorrect type of food contact surface is chosen. Some metals, such as zinc and copper, react with acidic foods creating taint and food poisoning.
  - Copper toxicity, also called copperiedus, is a type of metal poisoning caused by an excess of copper in the body. Copperiedus can occur from eating acidic foods cooked in uncoated copper cookware or from exposure to excess copper in drinking water.
  - Zinc toxicity is the excess absorption of zinc which can suppress copper and iron absorption.

The site must have planning permission, must have access to suppliers of potable water, electricity and gas and must have adequate drainage facilities. The site must not be liable to flooding or contamination from chemicals, dust, odour or pests.

The design should provide for a continuous linear workflow. Work should flow from the raw to the finished product, with high risk food kept in controlled conditions and outside of ambient temperature ranges as much as possible. Adequate work space must be provided, and every effort must be made to separate dirty from clean processes e.g. vegetable and washing up areas must be separate from actual food preparation and service areas. The layout must ensure a continuous work flow in one direction in order that cross-over of foods and any cross-contamination is avoided. Other essential design features should include the provision of adequate:

- Facilities for personal hygiene, with hand basins conveniently positioned near work stations.
- Means to control temperature at all stages of work.
- Access to all parts of the premises, including receiving yards and refuse areas, to enable thorough cleaning and disinfestation to be carried out.
- Pest infestation prevention – all pests must be denied access, the use of self-closing doors, air curtains and similar measures help to achieve this.
- Staff facilities - locker area, changing rooms and appropriate number of toilets and urinals as per the regulation.

Equipment should also be placed so that it is easy to clean. Equipment must either be able to be lifted easily from the surface to clean or heavy equipment should be attached to the surface. Any equipment e.g. cutting equipment must have safety features, such as guards, and all staff must be trained on how to operate such machinery.

Construction of the food premises

Ceilings

Ceilings must be solid and made from materials that are smooth, rust free, have no open joints, non-toxic, cleanable, non-absorbent, impervious, light coloured, not easily damaged by condensation, water resistant and capable of supporting ventilation grills and pipework.

Ceilings and overhead pipes/beams/ventilation systems/electrical reticulation which are above preparation areas must be accessible for cleaning. Where possible, these should not be surface mounted and high enough to avoid condensation. Openings (for piping/vents) must be properly sealed at edges.

Walls

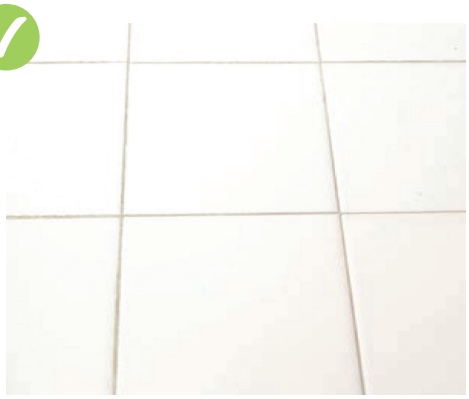
Walls must be smooth, impervious, non-flaking, light coloured (so that dirt is easily visible) and capable of being thoroughly cleaned. The surface should resist spills, chemicals, grease, heat and impact. Pipework which passes through walls must be adequately sealed and any brackets must be easy to clean. Suitable surfaces include glazed tiles, plastic sheeting, stainless steel sheeting or splash backs behind sinks and worktops.

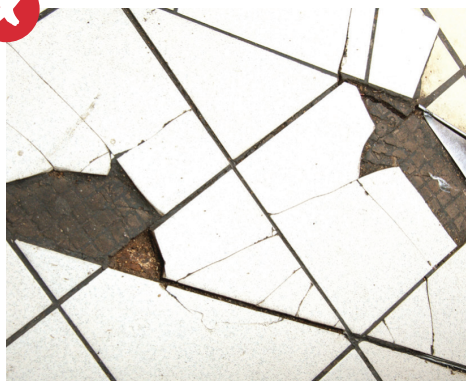
The walls should never have cracked tiles or flaking paint and should be included on the department's cleaning schedule.

Windows
If the windows are kept opened, they must be fitted with fly screens (important to include on the cleaning schedule). The window sills must be sloped at a 45° angle which will assist in not allowing birds to perch. Wooden windows must be avoided. Glass, if in direct proximity to work preparation surfaces, must be shatterproof.

View Glass Policy under policy section and Glass Breakage Form under checklists section for more details.

Doors
Dual swing doors required at openings into preparation areas and must not be made of wood.





Floors
Floors must not have open joints or open seams and must be made of smooth, rust free, non-toxic, cleanable and non-absorbent material that is dust-proof and water-resistant.

When selecting floor covering, the following must be considered:
- The volume and nature of the traffic going through that area e.g. fork lift trucks or trolleys.
- Whether the area is wet or dry.
- How the area will be cleaned - for instance, by steam/high pressure hose/mop.
- What resistance will be necessary against chemicals - such as acid, grease or salts.
- Safety issues - such as non-slip surfaces.
- The type of sub-floor - solid types are most suitable for tilted surfaces.
- To be constructed of durable, water-resistant material.
- If tiles present, they must be smooth and not cracked. Any joints/expansion joints must be treated.
- Concrete floors sealed to prevent build-up of soil/release of dust. Screed flooring is ideal.
- Must have adequate drainage facilities to avoid pooling of water i.e. must be sloped towards drains.
- All channels to be covered with removable rust resistant grids. All junctions shall be closed and covered. Any visible ridges, steps, grooves, dents etc. will not be acceptable.
- Mezzanine floors must be completely sealed.
- Wherever cold and freezer rooms open onto a passage, whereby an external ramp will impede the travel pallet jacks/ trollies/stock. Such ramps will be constructed on the above requirements.

Suitable surfaces include epoxy resin, ceramic or quarry tiles, welded anti-slip, vinyl sheeting and oily urethane sealed flowcrete.

Ventilation
Adequate ventilation in departments is essential – the size of the windows per square metre of room must be calculated, as per local authority's fenestration guidelines or artificial ventilation introduced. It must prevent excessive heat, condensation, dust and steam and remove odours and contaminated air.

When planning a ventilation system, expert advice should be sought to ensure that food areas have the recommended number of air changes. Good ventilation provides reasonable working conditions, reduces humidity and temperatures which encourage bacterial multiplication and help to reduce grease and the staining of ceilings, so reducing the need for frequent redecoration.

Drop-temperature is required for the butchery and produce preparation areas while also recommended in the receiving area and produce merchandising area.

Air intake points should be 1m above internal floor level and outside surfaces. These should be fitted with fly screens and dust filters.

The way in which a kitchen is ventilated depends on the type of cooking equipment, the cooking process used and layout of the kitchen, for example, a fan activated hood over the stove or cooking area can clean and re-circulate dirty air by passing it through replacement filters.

Ventilation canopies over equipment must be of the correct size to effectively capture dirty air from kitchen equipment. Canopies are usually made of stainless steel to ensure durability and ease of cleaning. The filters must be able to be cleaned easily. An extraction system must be designed so that it is easily accessible and maintainable.

It is a SPAR audit requirement that the extraction ducts be serviced and cleaned a minimum of bi-annually. A certificate must be available at the time of audit for inspection by an external service provider.

Work surfaces
All work surfaces in a food preparation area must be smooth, have no open joints, impervious, free from cracks, dents, non-porous, rust resistant and easy to clean. Preparation surfaces should be at the correct height (900mm counter height) and provide a firm base on which to work. If materials other than stainless steel are used, such as plastic laminate (heat resistant), care should be taken to seal all gaps between sheets of the material which could harbour food scraps. The material must be able to withstand repeated cleaning without premature deterioration, pitting or corrosion. A good practice would be to have all the work surfaces on wheels so that they can be moved to clean the floor properly. Ideally all free-standing equipment should also be mobile.

Water
There must be a good supply of potable water from the rising main.
Hot water to always be available – ideally at 49°C for the wash-up sink inside the production areas and for the hand wash basins 39°C.

Electricity & Gas

Flexible connections are best for gas (installed by a registered contractor) so that it is easy to clean around the supply pipes without the risk of damage. Note: Flexible gas pipes cannot exceed 3m from both contact points. Ensure that the installation company issues a certificate after installation to ensure the store is legally approved for the installation and the number of gas bottles in use.

There should be an adequate number of electrical plug points for electrical equipment. They should be placed conveniently so they are easy to reach and use. Controls should be fixed clear of equipment to prevent them becoming dirty or wet during cleaning; electrical wires should be protected by waterproof conduit; isolators and all switches should be flush fitted.

Lighting

There should be steady, uniform lighting, free from glare and shadows. There must be suitable and sufficient lighting to help staff to maintain a clean, safe working environment without eye strain.

All lighting in food preparation areas must be, where suspended ceilings are present, (600 x 1200) LED light fittings with prismatic or opaque polycarbonate diffusers, providing a minimum of 1000 LUX at 1000mm above finished floor level, and must produce a light colour temperature of 4000K. All diffusers must be of polycarbonate material and not glass or Perspex.

Fluorescent lights are excellent to use in a kitchen; however, tubes should be fitted with diffusers to prevent glare. Lights must be covered in these areas to protect food from contamination should bulbs shatter.
Fish and meat display areas will require the use of lighting with a specific CRI value, in these areas the specified CRI will take preference.
LED light longevity guarantees must be applicable to ambient temperatures of 27°C or greater.

LED colour temperature ranges should be as follows:

- Sales floor area over gondola runs - 4000K
- Sales floor area over fresh produce area - 3000K
- Sales floor area over bakery - 2400K
- Preparation areas - 4000K

Drainage

A proper drainage system will allow floors to be cleaned and washed properly with a drain hole in the centre of the floor. There should be at least one drain surface next to the sink. Each store must have a double sink for washing, allowing you to clean with detergent and rinse prior to draining. Each store must have a vegetable preparation sink that is separate from the dish washing sink in the food preparation area.

There must be sufficient drainage in a good state of order and repair, laid to an adequate fall and flowing clean/high risk areas to dirty/raw areas. All gulley's must have traps, internal inspection holes should be double sealed – grease traps may be necessary.

Drains, grease traps, gullies and overflows must be designed so that they are easy to reach, easy to clean and are free from any blockages. Fat traps must be fitted.

Fridges and Freezers

Adequate space to be provided in fridges/freezers. Smooth walls and surfaces that can be easily cleaned. Racks must be provided so that no food is stored on the floor. Racks are to be constructed of high-density plastic and/or rust resistant metals and should not include any wood construction.

Staff

Space, e.g. lockers are required for staff to store personal belongings, see section on personal hygiene for more details.

Adequate facilities (canteen) for staff meal breaks should be provided as eating and drinking are not allowed in production areas.

Protective clothing

Staff must remove protective clothing before going outside on a break, therefore hooks should be provided outside the door of the food preparation area. See section on personal hygiene for more details.

Cleaning chemicals

Ideally there should be a separate store room for cleaning chemicals and cleaning equipment. Cleaning materials should not be stored with food. This will ensure that chemical contamination does not occur and that the odours from the cleaning chemicals do not taint the food.

The cleaning material/chemical store must be placed where it is close to the delivery area and where it is easily accessible to the fresh departments. The cleaning store should be well ventilated.

Chemicals must be controlled and therefore a special area should be dedicated to the storage of chemicals, e.g. a lockable cupboard or cage.

Cleaning equipment

When designing a store's storage area for cleaning equipment, there should be enough space for the cleaning equipment so that it is easy to store and easy to access. Clips and hooks against a wall will help with the effective storage of brooms and mops. Equipment must be stored off the floor and away from food items.

Damages/returns

Demarcated areas in all storage sections, inclusive of fridges and freezers, must be provided for keeping damages/returns and this must be clearly marked with signage. The safety factor is to prevent this stock being used by mistake. Waste must be removed from the store daily.

Hand Washing Facilities

Each preparation area must be fitted with a handwash station, i.e. butchery, hot kitchen, deli hot and cold, produce and bakery preparation area.

- The handwash station must be accessible to staff.
- Hot and cold water must be provided.
- Taps must be operated by elbow, knee or foot.

It is highly recommended that knee or foot operated systems be put in, since staff are still likely to use their hands for the elbow operated taps out of habit.

- The handwash station must allow space to be fitted with:

1. A hand soap dispenser.
2. A paper towel dispenser or wall mounted air dryer.
3. A hand sanitizer dispenser.
4. A pedal bin for paper towels.

Receiving bays

Ideally, sealed docking bays should be provided. The receiving bay must be covered to protect food from environmental contaminants e.g. rain/dust and effective pest prevention in the best available method to be in place.

Waste

Skips must be located as far as possible from production areas.

Revamps

- Before a revamp is undertaken, all food safety factors must be taken into account. Food must be protected from contamination by dust/falling splinters/nails, therefore food must not be prepared under open construction! Another area must be provided, so this should be carefully thought through when planning the revamp.
- All construction or maintenance personnel must wear protective clothing.
- A store is not allowed to abort the food safety audit due to a revamp; if the store is open to customers and trading product a food safety audit will take place.

Please view the National Building Specifications and Schedule of Finishes manual available on Retail Studio for details on the full design and construction specifications that SPAR requires.