

## 11 CONSTRUCTION AND TYPE OF FINISHES FOR FOOD SERVICE UNITS AND DININGHALLS

### 11.1 Floor Surfaces and Floor Coverings

#### 11.1.1 Characteristics of a floor covering

*The ideal floor covering must:*

- Be durable.
- Be resilient.
- Be resistant to moisture.
- Be resistant to low temperatures e.g. cold room and freezer rooms.
- Be resistant to food stains, scratch marks, acids, alkaline substances, fatty marks and other chemicals.
- Be resistant to permanent indentations, or damage by heavy equipment or traffic.
- Be colour-fast and pleasant on the eye. Shades of green to light green and light brown are recommended.
- Not be slippery.
- Be easy to clean.
- Have few joints and the joints must not be wider than 3-4mm, unless the joints are completely filled with a suitable material. It facilitates cleaning of the floor surface.

#### 11.1.2 Types of floor surfaces

##### 11.1.2.1 Specially treated concrete for example "coroplate"

- "Coroplate" contains a specially processed metal aggregate, a laboratory tested and selected cement binder, approved plasticity, effective water reduced additives as well as other important ingredients. "Coroplate" is recommended as extremely suitable for heavy duty areas in food service units.

*Advantages:*

- It provides a dry metal-like surface which can be applied easier and thicker than any other similar floor surface.
- It is a strong, very durable floor surface.
- It is resistant to food stains and chemicals.
- It is easy to clean and maintain.
- It is a smooth, relatively non-slippery floor surface that is resistant to weathering and with few joints. The joints are also completely filled with an epoxy material.
- It is relatively cheap.
- It is available in different colours.

*Disadvantages:*

- It is a metal containing surface that can possibly rust where it weathers.

##### 11.12.2 Ceramic Tiles

- A ceramic tile is a glazed quarry tile. It is available in a variety of colours, sizes and designs. It must have a mat finish when installed in food service units. The size tiles recommended for food service units is 300mm x 300mm or 400mm x 400mm. The bigger tile is better, because there are less joints. The joints between tiles can also be filled with copper instead of epoxy.

**Advantages:**

- It is resistant to heat, cold and moisture.
- It is resistant to acids, alkaline substances, food stains and scratch marks.
- It is attractive.
- It is relatively durable.
- It is easy to clean

**Disadvantages:**

- It is not resilient.
- It cleans with difficulty when the joints are too wide.
- It is slippery.
- Ceramic tiles crack or are damaged when heavy or sharp objects fall on it.

### 11.1.2.3 Waterproof polyester screed

- The floor finish is known as "Gehopon" (type of paint).
- *There are three different "Gehopon" systems, namely:*
  - "Gehopon" wall-and floor covering system.
  - "Gehopon" thin floor covering system.
  - "Gehopon" thick floor covering system.

**Advantages:**

- It is resistant to water and steam.
- It is resistant to alkaline substances, acids and most chemicals.
- It is without joints. It is therefore easy to clean.
- When used as wall covering, it is more economical than plaster.
- It is a mould resistant covering and therefore very suitable for example cold rooms.
- It can be applied to many surfaces for example concrete, cement, tiles and galvanised metals.
- It is a strong, durable covering.
- It is non-static and heat resistant.
- To prevent that the floor surface is too smooth for use in food service units, quartz sand can be added during the manufacturing of the floor covering.

**Disadvantages:**

- It is not resilient.
- The epoxy-covering weathers easily in heavy duty areas.

### 11.1.2.4 Vinyl sheets or- tiles

- It is more suitable for dining halls.

**Advantages:**

- It is attractive. A big variety of colours and designs are available.
- It is easy to clean.
- It is easy to install.
- It is available in different sized tiles or sheets of to 40m long and 4m wide.
- It is non-static.
- It is resilient.
- Heavy-duty vinyl covering is resistant to mechanical damage or indentations by example light equipment such as trolley wheels.
- Vinyl strips are very suitable for use as a wall covering.
- Vinyl strips are more hygienic than vinyl tiles because of less joints.

***Disadvantages:***

- It is damaged by acids and alkaline substances.
- It is slippery, especially when wet.
- It is not very resistant to over-modest heat and steam.
- The joints tend to absorb moisture, especially during the cleaning process, it weathers easily in heavy-duty areas as a result of intensive cleaning processes.

## **11.2 Wall Coverings**

### **11.2.1 The ideal wall covering must:**

- Be smooth.
- Be washable.
- Be resistant to moisture.
- Be resistant to stains.
- Be resistant to moulds, especially in areas where heat, steam and moisture are present, for example washing-up areas and cold rooms.
- Be resistant to low temperatures for example cold- and freezer rooms.
- Have a mat finish and the colour of the wall coverings must tone in with the floor surface or floor covering.

### **11.2.2 Types of wall coverings**

#### **11.2.2.1 Paint**

- Correct preparation of the wall surface and ceilings before it is painted is of great importance. The directions for use of a specific paint must be followed with accuracy.
- Polyester screed.
- Floor surfaces and floor coverings. (Refer to paragraph 11.1.2.3).
- Vinyl sheets
  - Floor surfaces and floor coverings (refer to paragraph 11.1.2.4). The construction at the connection of the walls and floor surfaces must be such that it forms a convex curve or a corner of 45° with the floor surface to prevent damaging of floor- and wall coverings and easy cleaning.

#### **11.2.3 Bumper rails**

- To protect walls from damage by mobile equipment, a bumper-, or plastic-, or epoxy coated metal framework, of  $\pm 100\text{mm}$  wide,  $\pm 80\text{mm}$  from the wall, must be fitted  $\pm 260\text{mm}$  above the floor surface in suitable areas for example cold rooms, trolley parking- and trolley movement areas.

## **11.3 Ventilation and Vapour Hoods**

### **11.3.1 The ventilation system of a food service unit**

*The ventilation system of a food service unit must comply with the following requirements:*

- A choice is usually exercised between natural ventilation- or mechanical ventilation systems.
- The purpose of a ventilation system is to remove steam, heat and vapour, to prevent condensate, smells and the building-up of high temperatures and humidity in the food service unit. It must also the flow-in of fresh air and effective air distribution, but at the same time it must prevent a draught through the unit. In small food service units ( $\pm 100$  meals/day) natural ventilation should be sufficient.

- In larger food service units the flow of air is usually controlled by extractor fans or another mechanical ventilation system.

### 11.3.2 Regulation of ventilation and temperature in the food service unit

- Water vapour and oil vapour are best regulated if it is removed from the area where it originates, by withdrawing the air from the area.
- Various systems can be used for this purpose. It includes vapour hoods over the cooking area and extractor fans above or at the dishwasher area.
- The strength of the air flow must be sufficient to ensure that impurities are carried away by the air stream. It is dependant on the quantity of air withdrawn in a certain period.
- A too high a speed of air removal, directly above the cooking area, may influence the temperature of heat provision of equipment and its regulation. Temperatures above 25°C causes discomfort, as well as physical and emotional exhaustion of food service personnel.
- The temperature in the food service unit should not drop too low so that it causes physical discomfort.

## 11.4 Illumination

### 11.4.1 Purpose of effective illumination

*The provision of effective illumination through natural and artificial illumination in a food service unit and dining hall is essential to:*

- Ensure that the division and equipment are kept thoroughly clean.
- Ensure that quality control of food is carried out thoroughly.
- Ensure that specialised tasks such as preparation garnishing and serving of food are carried out effectively.
- Ensure the convenience and comfort of food personnel and prevent physical and emotional exhaustion.
- To prevent contrasts in illumination and thereby reduce the risks of accidents; and
- Prevent reflection in the field of vision.

### 11.4.2 Artificial Illumination

- Illumination fittings should be manufactured from rust free material and preferably be mounted against the ceiling. Tube-lights installed above preparation- dishing-up- and serving areas, must be covered with transparent glass.
- Fluorescent tub-lights are generally used. It provides effective illumination, it has a lower heat radiation, is durable and the lower concentration of brightness of a tube-light is less likely to cause reflection. It is available in different strengths. Example:
  - 1,2 meter single tube 40W and double tube 80W
  - 2,4 meter single tube 80W and double tube 160W.
- In a food service unit, the colour cool white, 40W and 80W single or double tube, is recommended. The white colour emphasises yellow-green colours, while it weakens red.
- Unnecessary ceiling shadows caused by vapour hoods can be prevented by installing additional illumination fittings around or inside the vapour hoods.
- The illumination requirements to provide the required level of illumination can be calculated. The coefficient of use is determined by:
  - The type and height of the light coupling;
  - The height and size of the room; and
  - The reflection values of the ceiling and walls.

- The general distribution of light in the food service unit must be 0,4% to 0,6%.
- The illumination fittings in cold rooms and freezer rooms must be moisture proof and insulated to prevent penetration of moisture.
- The illumination fittings in a dining hall can also be decorative and should unite with the architectonic aspects of the dining hall, while at the same time ensuring effective illumination.

## 11.5 Warm and Cold Water Supplies

### 11.5.1 Supply of warm and cold water in the food service unit

- Large amounts of warm and cold water are used in a food service unit. The correct diameter of water pipes are therefore essential.
- Although the chief warm and cold water-pipes are layed along a channel or tunnel, it must be well insulated to prevent unnecessary heat loss in the event of warm water supplies.
- Water supply to the cooking area must be coupled from beneath the floor surface to the specific equipment.
- Water supplies and turn-off points are required for all other areas in the food service unit. A shorter network of pipes should be used rather than long branchings.

#### Water supply points

POINTS WHERE REQUIRED	WARM WATER	WARM WATER
Drinking water points	y	-
Vegetable pre-preparation area	y	-
All other preparation areas	y	*
Vegetable peeler	y	-
Vegetable washer	y	-
Cooking area	y	*
Pot- and pans wash-up area	y	*
Dishwash area (machine)	y	*
Trolley wash area	y	*
Refuse storage area	y	*
Cleaning equipment storage area	y	*
Hand wash-basins	y	*
Toilet bowls	y	-
Showers	y	*

\* Warm water refers to 60-65°C.

## 11.6 Drainage in a Food Service Unit

### 11.6.1 Planning of effective drainage

- The planning of effective drainage in a food service unit is essential. The removal of water from the cooking area that is planned in an island-type grouping, must be transported with individual drainage openings at the outlet tap or the tilting position of each piece of equipment, to a collective drainage point. This drainage point must preferably be outside the building and must be big enough to handle the volume of water. Loose grids which fit over the drainage opening and pipe connection, must effectively catch up food particles and congealed fat and the grids must be easily removable for cleaning purposes. The drainage opening in front of equipment must be placed such that the outlet of the equipment fits over the opening, even when it tilts 90°.

### 11.6.2 Removal pipes

- The water coming from sinks, vegetable peelers, dishwashing machines and the refuse removal area, inevitably contains more solid refuse material and must be transported directly to an individual drainage point which is situated adjacent to an exterior wall of the building. The individual removal pipes of such equipment or areas must have a diameter of at least 50mm. Long lengths of removal pipes underneath the floor must have a bigger diameter to ensure a faster flow of the contents. Where three drainage pipes join each other, a 100mm drainage pipe is used..
- The diameter of the removal pipes must be wider if more drainage points join each other. Pipes of 120mm-180mm in diameter are used where the drainage system joins the municipal drainage system. Removal pipes must be manufactured from a strong, rust-free material with gas-proof joints. Copper, galvanised iron and bitumen coated cast iron pipes are generally used. The pipes must be situated in a straight line with a slope of 1:40 or 1:48 between the connection joints. It is important that the refuse material does not collect at the connection points and provision must be made for automatic rinsing. Provision must also be made for effective ventilation at the pipe network.

### 11.6.3 Drainage openings

- The drainage openings at equipment must be level with the floor surface, with at least 400 x 400 mm dimensions.
- The round opening beneath the floor surface which joins the removal pipe system, must be at least 40mm in diameter. The drainage opening at equipment must be covered with a suitable metal grid. A type of stainless steel drainage opening ( $\pm 200$ mm diameter) can be installed on the rest of the floor surface. It consists of a removable unit with a lid and sieve, to catch-up solid refuse, which will prevent blockage and will facilitate cleaning. The placement of drainage openings **must** be such that it is level with the floor surface and will ensure, together with the slope of the floor surface effective, drainage.

## 11.7 Ceilings for a Food Service Unit and Dining hall

### 11.7.1 Finish

*The ceiling finish must:*

- Not attract dirt and dust;
- Not tend to crack or peel;
- Be easily cleaned;
- Absorb sound and noise;

- Not be a fire hazard;
- Suit the design and finish of the entertainment hall;
- Contribute towards the acoustics and décor of a dining hall;
- Be moisture proof.

To reduce the risk of condensate formation on ceilings, the ceiling and roof construction should have a thermic transference value of less than 0,97W/sq.m°C\*.

*\*Note: W/sq.m°C (Watt per square meter degrees Celsius) = unit for thermic transference.*

## 11.8 Storage Facilities

### 11.8.1 Introduction

*The amount of space allowed for the storage of supplies varies at different food service units and is influenced by different factors. The following factors must be taken into consideration:*

- The size of the specific food service unit. The number of meals prepared and served.
- The type of menu
- The type of food system
- The manner and height to which certain containers are stacked, the height of the shelves and the space required for movement and entrance;
- The purchase and delivery policy of the specific hospital or institution. The perishable provisions are stored according to prescribed procedures. Groceries can be stored in a central store at a hospital or institution and be delivered according to a specific issuing policy, or it can be delivered directly to the food service unit.

### 11.8.2 Classification of storage areas

#### 11.8.2.1 Non-cooled storage area

- Grocery storage area;
- Weighing room and storage area for daily supplies;
- Bread storage area;
- Vegetable- and fruit storage area;
- Dry refuse storage area;
- Additional kitchen equipment and linen storage area;
- Cleaning materials and additional cleaning equipment storage area;
- Cleaning equipment storage area (in use)

#### 11.8.2.2 Cooled storage areas

- General cold room (such as left-over food, desserts, therapeutic diets and special feeds, portioned menu items);
- Eggs and dairy product cold Room        }       For Larger
- Meat cold room                                }       food service
- Vegetable and fruit cold room            }       units
- Refuse cold room
- Stainless steel industrial refrigerators with 3-5 doors (304 compartments) and shelves are planned for smaller food service units (refer paragraph 10.4.2.31).}

#### 11.8.2.3 Frozen storage areas

- Freezer room for larger food service units
- Chest-type or industrial freezers are planned for smaller food service units (refer paragraph 10.4.2.31). This type of storage is planned for frozen fish, poultry, vegetables, baked items, left-over food and ice-cream.

### 11.8.3 Summary of Factors influencing Storage

STORAGE AREA	SUPPLY ITEMS	STORAGE REQUIREMENTS AND TEMPERATURE	EQUIPMENT
<b>11.8.3.1 Non-cooled</b> a) Groceries	Groceries	Placement and construction of the grocery storage area must be such that the roof, walls and floors are moisture proof. It must not have a high humidity. Temperature of 18-20°C. Natural and artificial illumination is required. Reflection must be prevented and shelves must be at least 2 air exchanges per minute.	Adjustable epoxy coated steel shelves Mobile containers with parking space beneath shelves Mobile platforms ± 1200 x 600 x 300mm. Refer paragraph 10.2.2.2 Work surface, stainless steel with space for drawers and leg room Bar chairs Counter Scale * Multi-purpose trolley
b) Daily	Supplies as weighed for the following days use. In small food service units the area can also be used for the storage of bread.	As 11.8.3.1(a) there should be sufficient parking space for multi-purpose trolleys in this area.	Work surface, stainless steel with shelves. * Multi purpose trolley. (refer paragraph 10.4.2.C2 and paragraph 10.2.2.2)
c) Bread-	Fresh bread and baked items	As 11.8.3.1 (a)	* Mobile bread shelves. Epoxy coated wire shelves ± 1067 x 508m x 4-tier. (refer paragraph 10.4.2.C3).
d) Vegetable and fruit	Potatoes, onions, sweet potatoes, pumpkin, bananas, green paw-paw, green avocados	Temperature of 18-20°C. No daylight. Artificial illumination required. It must be placed so that there is an even distribution of light to all shelves, without causing shadows. Ventilation must be at least two exchanges per hour.	* Mobile shelves. (refer paragraph 10.4.2.C9 and 10.2.2.2) as well as **

STORAGE AREA	SUPPLY ITEMS	STORAGE REQUIREMENTS AND TEMPERATURE	EQUIPMENT
e) Dry refuse	Cartons, paper, crates and other dry refuse	Temperature of at the most 18-20°C. Drainage furrow where bins can be washed. See paragraph 11.1.1 for floor finishes and paragraph 11.2.1 for wall finishes.	Refuse bins on dolly. Warm and cold water. * Hosepipe with spout and nozzle. *Hooks for lids and bins
f) Additional crockery and linen	Additional supplies kitchenware, linen and decorations used for functions. In small food service units: also cleaning materials	Must be well ventilated. Natural illumination not necessary, but effective artificial illumination required. The walls must be painted and must easily be washed and cleaned. The floor must be durable and resistant to chemicals if cleaning materials are stored here.	* Shelves can be adjustable epoxy coated steel shelves with 1200mm moving space between the shelves. (Refer paragraph 10.4.2.C12).
g) Cleaning materials and unused cleaning equipment-	All cleaning materials and unused cleaning equipment	Must be well ventilated (Refer paragraph 11.1.1 for floor finishes and paragraph 11.1.2 for wall finishes)	Adjustable steel shelves ± 900 x 380mm x 5 tier. Hooks on which cleaning equipment can hang. * Mobile platforms ± 1200 x 600 x 300mm.
h) Used cleaning equipment	Brooms, mops, buckets.	As 11.8.3.1(g). This area must have effective drainage.	Solid adjustable steel shelves ± 900 x 380mm x 5-tier. * Hooks above drainage furrow. Warm and cold water supplies.

**Note:** Refer to equipment manual for description of each item

\*\* Shelf, mobile, (for food) for non-cooled-, cooled- as well as frozen storage areas the sizes can be determined according to individual needs and be compiled from the following units:

**SIZE OF BASKETS FOR THESE SHELVES:**

Length	Depth	Height	Baskets	
390	565	1440mm	7	or
780	565	1440mm	14	or
1270	565	1440mm	21	or
390	565	2160mm	11	or
780	565	2160mm	22	or
1270	565	2160mm	33	

	Width	Length	Height
Type I	400	530	160mm
Type II	400	530	160mm

STORAGE AREA	SUPPLY ITEMS	STORAGE REQUIREMENTS AND TEMPERATURE	EQUIPMENT
11.8.3.2 Cold- a) General	Left-over food, desserts, therapeutic diets and special feeds.	Temperature of 4°C. Artificial illumination. Floor must be durable. Floor must slope towards the door where the drainage opening is on the outside. Doors must close tightly. Doors should be able to open from the inside in other words it must have a built-in safety mechanism and a reflecting safety sign at the door. Floor level on the same level as the food service unit floor.	Mobile shelves. (refer paragraph 10.4.2 C4 and*)
b) Dairy products and eggs	Milk, cream, margarine, butter and eggs.	Temperature 4°C. As 11.8.3.2(a)	Mobile and solid shelves Mobile platforms ± 900 x 1200 250mm (refer paragraph 10.4.2 C5 as well as note*)
c) Meat-	Fresh and processed meat products	Temperature 3°C. As 11.8.3.2(a)	Mobile stainless steel shelf ± 930 x 380 x 5-tier (Refer paragraph 10.4.2.C6)
d) Vegetables and fruit	Fruit, prepared vegetables	Temperature 7°C. Relative humidity of 85% is desirable. Artificial illumination must be available. As 11.8.3.2(a)	As 11.7.4.2(a)
e) Refuse storage	Food refuse from preparation and plate waste. In other words wet refuse	Temperature 0-3°C. Wall finish must be moisture resistant. Floor must be resistant to galvanised iron bins/plastic bins. As 11.8.3.2(a)	Refuse Bins on Dolly. Hooks for lids of bins (Refer paragraph 9.2C11 and 10.4.2C11)
f) Industrial refrigerators	Perishable food items stored separately and cleaned in compartments	Temperature 0-3°C.	* Removable stainless steel shelves

STORAGE AREA	SUPPLY ITEMS	STORAGE REQUIREMENTS AND TEMPERATURE	EQUIPMENT
<b>11.8.3.3 Freezer</b> a) Freeze Room	Frozen food such as fish, poultry, vegetables, ice-cream, baked items and left-over food	Temperature between –18°C to –20°C. Length of storage time may influence it. Frozen storage requirements usually based on 0,05 cubic meter/main meal/day. Influenced further by quantity frozen food on the menu and delivery policy. Maximum amount of specific food items, which must be stored for a specific time.	
b) Chest-type freezer	As 11.8.3.3(a)	Different liter sizes available e.g. 340-360 litre. (See paragraph 10.1.8, also 11.8.3.3(a).	Baskets which fit into freezer

Refer to equipment manual for description of each item.

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780	565	2160mm	22	or
1270	565	2160mm	33	

	Width	Length	Height
Type I	400	530	160mm
Type II	400	530	160mm

## 11.9 Office Space

To ensure effective functioning of the food service unit, certain activities must take place, for which office space are required namely, planning, record keeping, interviews, instruction and training as well as supervising activities.

### 11.9.1 Needs assessment

- Office space is required for supervisory officers for example dietician(s), food service manager(s), dietician in-training (where applicable), food service supervisor(s), as well as clerk(s) and food service students.
- Office space for clinical dietetic consultations must be planned separately at specific consultation points. Such as outpatient clinics.
- Office space must be provided with computer facilities according to the requirements of the specific institution.

### 11.9.2 Location and size

- Office space of the dietician and food service manager must be easily accessible without moving through the food service unit.
- The food service manager(s) must however have a view over the activities in the food service unit for the necessary supervision which takes place continually.
- The office space must also be within easy reach of the food service unit.
- The office space allowance per person is 2 x 3 meter with a minimum of 9 to 10 sq. m per person.
- Office space must be elevated above the floor surface to ensure more effective supervision.

### 11.9.3 Finishes

- Office space must be provided with transparent glass panels or brickwork below, not higher than 1 meter, to ensure a view over the food service unit.
- Adjacent offices space can be separated from each other with a sliding door, so that the space can be used for larger meetings or training opportunities.

### 11.9.4 Ventilation and Illumination

- Office space must be well ventilated and temperatures must be controllable.
- The illumination of office space must be effective without causing a reflection, or direct sunlight which can be disturbing on work surfaces.

### 11.9.5 Communication

- Telephone provision in each office is essential.
- An intercom system from offices must be planned for food service units.

## 11.10 Hand wash basins

*Hand wash basin must:*

- Be manufactured from stainless steel where persons handle food.
- Be within easy reach and be conveniently placed at different points within the food service unit.
- Be provided with warm and cold water (mixer taps), a soap dispenser, towel roll container or an electrical warm air hand dryer.

### **11.11 Fire Control**

- A food service unit must be effectively equipped to combat fire which may develop.
- Fire resistant material must be used during the construction of the food service unit.
- Elevators, gutters and ventilation tunnels must be able to close off in event of a fire.
- Portable fire extinguishers must be installed on a height within easy reach. Carbon dioxide- or soda acid types are recommended.
- Fire alarms must be installed.
- The amount and type of fire extinguishers must be planned according to the specific requirements of areas in the food service unit.

### **11.12 Wash, Change and Toilet Facilities**

#### **11.12.1 General**

- Toilet facilities for food service personnel must be provided as close as possible to the food service unit.
- Separate facilities must be planned for men and women.
- Separate provision of shower facilities, especially for food service personnel, are essential.
- The planning must comply with specific health regulations.
- Provision must be made for 1 shower for every 10 persons working in the food service unit.
- Provision must be made for the daily issuing of clean overalls and the receipt of used overalls, which must be stored separately. Overalls must be put on at the work premises.
- Lockable facilities for the storage of clean overalls and towels must be provided.
- Proper lockable cupboards, but preferably swimming bath baskets and in a lockable room, must be provided where clothes and personal articles can be kept.

#### **11.12.2 Finishes**

##### **11.12.2.1 Doors and ventilation.**

- Sewing doors that can close on its own must be provided and placed such that the toilet facilities are not directly visible from the outside. The doors of the main entrance to the area must be able to lock tightly and must be sound proof.
- The planning must comply with specific health regulations.
- Sufficient ventilation must be provided and a minimum of 3 air exchanges are required.
- Sometimes mechanical ventilation is required. Where an exterior wall is available, natural ventilation openings and windows can be used.

##### **11.12.2.2 Floor surfaces**

- The floor surface of these areas must be finished off with ceramic tiles with a mat finish. (Refer paragraph 11.1).

##### **11.12.2.3 Wall finishes**

- The wall covering can be vinyl sheets or painted with a mat type washable paint. (Refer paragraph 11.2).
- The cubicles between toilets can be light-weight frames with a suitable finish 150mm above the floor.

- The cubicles must be easy to clean and must be 1900mm high to ensure a good light distribution from the ceiling.

#### 11.12.2.4 Ceilings

- The ceiling construction must be sound-proof and suitable illumination must be provided. The ceiling may not be lower than 3 meters.

#### 11.12.2.5 Mirrors

- A full length mirror must be provided.

#### 11.12.3 Recommended Quantities and space Allowance for Facilities\*

Number of Persons on Duty at any time, Men and Women Separately	Hand Wash-Basins	Toilets**	Showers
1-10	1	1	1
11-20	2	2	2
21-40	3	3	4
41-60	4	4	6
61-80	5	5	8
81-80	6	6	10

*With one additional hand wash-basin and one toilet for every 25 persons more than 100.*

#### 11.12.4 Space allowance for wash-, change-, and toilet facilities

DEVICE	UNIT SIZE		SPACE REQUIRED Square Metre
	WIDTH mm	DEPTH mm	
Toilet Unit	840	1500	3
Urinal	610	300	1,3
Hand wash-basin	630	460	1,5
Soap Dispenser	350	250	
Towel Roll Container***	350	250	1,1

*Must comply with specific health regulations.*

**\*\*** *Reduce the number of toilets for men where urinals are available. Allocate one urinal for each 50 or less men*

**\*\*\*** *Can be replaced with a warm air hand dryer.*