



مدينة الشارقة للرعاية الصحية
Sharjah Healthcare City
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SHCC Guidelines

For Briefing, Design and Approval of Healthcare Facilities

Part C – Access, Mobility, Occupational Safety and Health (OSH)

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1.0 Space Standards and Dimensions

1.1 Corridors

There are many schools of thought on minimum corridor widths and the underlying principles that should dictate them. The requirements set out in this section should be regarded as the minimum required. These requirements take into account the need to allow for the movement of trolleys, beds, wheelchairs and other mobile equipment, including the passing of such equipment.

The overriding principle in setting the minimum corridor width is the need to allow for a workable width that, in the event of an emergency evacuation procedure, does not impede egress.

Note 1: Designers should note that other Building Codes might also specify minimum corridor widths for patient care areas with a focus on Fire Safety or Disability Access. The requirements of these Guidelines for certain areas may be higher than Codes such as Fire Safety since the subjects of concern are wider than those Codes.

Note 2: Most large Hospital Units include a range of patient and staff-only corridors. If staff-only areas are clearly designated by planning and are not required for patient access, then the Guidelines for patient corridors do not apply.

Note 3: All corridor widths are clear of hand-rails and/or crash-rails. It is recommended that for design purposes (and considering construction tolerances) 100mm be allocated to each hand-rail.

In areas where patient beds, trolleys and stretchers will be moved regularly, such as Inpatient Units, Operating Units, Obstetric Units and Intensive Care Units, the minimum clear corridor width shall be 2300mm.

The recommended corridor width in areas where there is frequent bed and trolley movement is 2400mm. Even at this dimension, special consideration must be given to the width of doorways into adjacent rooms and widening corridors at the entry to the affected rooms to accommodate turning trolleys and beds.

Corridor widths in the above areas may be considered at lesser dimensions where an existing building is utilized, but special design and planning detail must be incorporated to overcome the problems of congestion and the potential risk to patients and staff in an emergency evacuation.

Note: In any event, any corridors that may be used by a patient for any purpose may not be narrower than 1800mm wide.

In areas where irregular trolley or bed movement is expected, such as Radiology, corridor widths can be reduced to 2000mm. Special consideration must be given to the door widths to ensure the movement of trolleys or beds from corridor to adjacent rooms is not restricted.

In areas where there is no patient movement requirement such as a corridor to a group of staff offices, corridor widths of 1200mm are acceptable, provided that fire egress and accessibility requirements are met.

Corridor widths of less than 1200mm are unacceptable in patient care areas, except where forming part of an existing facility, and where written approval has been obtained for the lesser width.

The width of major inter-department arterial corridors and public corridors generally shall be as wide as is deemed necessary for the proposed traffic flow, but shall not be less than 2400mm.

Note: In these Guidelines, the inter-departmental corridors are also referred to as 'travel'. Corridor widths shall mean clear, unobstructed widths. Items such as hand-rails, drinking fountains, hand basins, telephone booths, columns, vending machines and portable/mobile equipment of any type shall not reduce the minimum width or impede traffic flow.

Consideration shall be given to the elimination of potentially dangerous 'blind spots'.

1.2 Ceiling Heights

The minimum acceptable ceiling height in occupied areas shall be 2400mm, but consideration should be given to the size (aesthetic consideration) and use of the room. A ceiling height of 2700mm is considered more appropriate in work areas such as Therapy Rooms, Conference Rooms and Kitchens. Ceiling heights in Ensuities can be reduced to 2250mm where required, to accommodate building services and structure.

Patient bed areas including bedrooms, Intensive Care Unit (ICU), Coronary Care Unit (CCU), High Dependency Unit (HDU), Emergency, Recovery Rooms and the like must be a minimum of 2700mm.

The minimum ceiling height in areas such as corridors, passages and recesses shall be 2400mm. In portions of remodeled existing facilities, the corridor ceiling height may be reduced to 2250mm, but only over limited areas such as where a mechanical duct passes over a corridor. A reduced ceiling height for no greater corridor length than 3000mm is acceptable. The extent of any such variation from the above recommendations must be approved in writing.

In areas where access is restricted such as drinking fountain recesses, a minimum ceiling height of 2250mm is acceptable.

Rooms with ceiling-mounted equipment, such as X-Ray Rooms and Operating Rooms will require increased ceiling heights. Heights should comply with equipment manufacturers' recommendations. Operating Room, Interventional Imaging Room and Birthing Room ceilings must be no less than 3000mm.

Minimum ceiling (soffit) heights of external areas such as entry canopies, ambulance entries and delivery canopies should suit the requirements of the vehicles expected to use them. Special consideration is to be given to the impact of whip aerials fitted to emergency vehicles.

Ceiling or roof heights in Plant Rooms are to suit the equipment and allow safe access for service and maintenance. The minimum recommended height is 2400mm. The requirement for a ceiling to be installed in Plant Rooms will be dependent on the type of plant equipment and the Operational Policy of the facility.

1.3 Department Sizes

Department sizes will depend upon the perceived facility role as set out in the Operational Policy and the organization of services within the hospital. Some functions may be combined or shared, provided the layout does not compromise safety Standards and medical and nursing practices.

Note: Departmental sizes also depend on design efficiency. For Guidelines on this subject, refer to Efficiency Guidelines and Schedule of Circulation Percentages in this section.

1.4 Efficiency Guidelines

1.4.1 General

The concept of efficiency refers to the ratio between Net Functional Areas and Circulation Space. Simplistic Guidelines on efficiency tend to be misleading and should not be applied to vastly different functional briefs.

It is more appropriate to allocate different circulation percentages for generically different planning units. Such a guide has been provided under the Schedule of Circulation Percentages in this section. Inadequate circulation allowance in briefing documents is not recommended as it can result in undue pressure on designers to reduce sizes and therefore functionality. It must also be noted that the circulation percentages are a guide only. They apply to the Functional Planning Units (FPUs) included in these Guidelines under Generic Schedule of Finishes. For larger planning units, a different percentage may be appropriate.

1.4.2 Net Functional Areas

In briefing documents, Net Functional Areas represent the sum of individual room areas without any corridors.

Refer to Part B – Planning: Area Measurement Methodology for a description of how to measure areas off the plans.

1.4.3 Gross Departmental Areas

Gross Departmental Areas are calculated by adding the Net Functional Areas and departmental corridors. These are corridors that are entirely within one department (or FPU). In calculating the departmental corridors, the following should be taken into account:

- Service cupboards and passing risers are excluded
- Corridor wall thicknesses are excluded as these are included in room areas
- Columns are included
- Fire stairs are excluded
- Lifts and lift shafts are excluded.

1.4.4 Travel

'Travel' represents arterial corridors that connect the FPUs. Travel is required to allow passage from one unit to another without going through the internal corridors of another FPU. A target of 15% is appropriate for Travel in a hospital of one to two stories. Travel can be considerably reduced in high-rise buildings since in many instances corridors are replaced by vertical transportation.

In calculating travel, the following should be considered:

- Wall thicknesses are excluded as these are part of the Gross Departmental Areas
- Fire stairs are included once for each floor-to-floor connection
- External wall thicknesses are excluded
- Lift shafts are excluded
- Service cupboards are excluded
- Service shafts and risers are excluded.

1.4.5 *Engineering*

Engineering refers to the area of Plant Rooms and other service areas. In calculating the Engineering allowance, the following areas should be included:

- Service cupboards
- Lift Motor Rooms
- Service shafts and risers.

Lift shafts should be excluded. The target of 15% applied to Gross Departmental Areas may be used for a typical one to two-story hospital building.

1.5 Schedule of Circulation Percentages

Recommended Circulation Percentages for typical Functional Planning Units (FPUs) are as follows:

No	Department or Functional Planning Unit (FPU)	Minimum Circulation
1	ACUTE MENTAL HEALTH UNITS	32
2	ADMINISTRATION UNIT	20
3	ALLIED HEALTH UNIT	25
4	BIOMEDICAL ENGINEERING	20
5	CATERING UNIT	25
6	CLEANING/HOUSEKEEPING UNIT	10
7	CLINICAL INFORMATION UNIT	15
8	CORONARY CARE UNIT	35
9	DAY SURGERY/PROCEDURE UNIT	35
10	DENTAL UNIT	20
11	EDUCATION AND TRAINING UNIT	15
12	EMERGENCY UNIT	40
13	ENGINEERING AND MAINTENANCE UNIT	15
14	INPATIENT ACCOMMODATION UNIT	32
15	INTENSIVE CARE UNITS	40
16	LAUNDRY/LINEN HANDLING UNIT	10
17	MEDICAL IMAGING UNITS	35
18	MORTUARY UNIT	15
19	NUCLEAR MEDICINE UNIT	30
20	OBSTETRIC UNIT	35
21	OPERATING UNIT	40
22	PEDIATRIC/ADOLESCENT UNIT	32
23	PATHOLOGY UNIT	25
24	PHARMACY UNIT	25
25	PUBLIC AMENITIES UNIT	10
26	RADIATION ONCOLOGY UNIT	30
27	REHABILITATION UNIT	32
28	RENAL DIALYSIS UNIT	32
29	STAFF AMENITIES UNIT	10
30	STERILE SUPPLY UNIT	20
31	SUPPLY UNIT	10
32	WASTE MANAGEMENT UNIT	20

2.0 Ergonomics

2.1 General

All facilities shall be designed and built in such a way that patients, staff, visitors and maintenance personnel are not exposed to avoidable risks of injury.

Badly designed common elements such as workstations and the layout of critical rooms have a great impact on the Occupational Safety and Health (OSH) of staff as well as the welfare of patients.

The field of Ergonomics covers some aspects of the design of objects for common use. However, research indicates that experts disagree on some aspects of Ergonomic Standards such as the best sitting posture or angle of view for monitors. On most Ergonomics issues, however, there is broad agreement amongst the experts.

It is not appropriate for any standard to be regarded as ideal for every person. A writing bench or hand basin that is entirely suitable for one person may be inappropriate for another person. It is also unreasonable to expect all such objects to be designed in such a way that they can be adjusted for all users.

Given these limitations, the more practical role of Ergonomics Standards is to provide a reasonable common base for design. It is recommended that the actual design allow for various objects to be modified, if necessary to accommodate the special needs of the relevant staff.

Nothing in these Guidelines is intended to create a situation where the needs of all possible preferences or indeed the highest possible Standards are implemented in all situations. The Ergonomics Standards included in these Guidelines are those commonly debated in relation to health facilities. For items not covered in these Guidelines, it is highly recommended that other international Standards for Ergonomics be followed.

Where a facility is designed for staff or patients with special needs, some deviation from these Standards may be appropriate. In such circumstances, it is recommended that designers seek advice from specialist Ergonomics experts or OSH officers.

2.2 Disabled Access

Other mandatory Standards for Accessibility and Barrier Free design cover the subject of access for people with disabilities. Particular attention is given to access ways and circulation and consistent linkages suitable for use by people who use wheelchairs and facilities for people with ambulatory disabilities and for people with sensory disabilities. These Guidelines will not duplicate those requirements.

Parts of the facility may be specialized for use by patients (or staff) with particular disabilities. In such areas, the needs of the most common disabilities shall be considered and allowed for. In short, 'specialization' is not seen by these Guidelines as non-compliance in relation to other Accessibility Standards

It is the requirement of these Guidelines that a minimum number of rooms be sized and designed for use by people with disabilities regardless of the anticipated number of patients with disabilities. These are covered in the relevant sections of the FPU's in Part B. The balance of these Ergonomic Guidelines covers the average use of facilities by able-bodied persons.

2.3 Standards Table

For simplicity, the Ergonomics Standards are presented in a table form under several categories. All items should be regarded as recommendations. Items that are mandatory are clearly noted.

Item	Condition	Depth mm	Height mm	Thickness mm	Mandatory	Remarks
Workbench	Utility	600	900	32	No	Flat Monitor
Writing bench 1	Typing	900	720	Max 50	No	CRT Monitor
Writing bench 2	Typing	750	720	Max 50	No	Flat Monitor
High Counter (Parcel Shelf)	Over bench	250	1150	20–32	No	600 reach to the inside edge of counter
Shelving	Over 900 ht bench	350	1520–1810	20	No	2 shelves
Shelving	Over 720 ht bench	350	1370–1710	20	No	2 shelves
Shelving Unit	Full Height	350–400	1500–1810	20	No	7 shelves adjustable

2.4 Staff Station

2.4.1 General

A Staff Station may be used for a variety of purposes including:

- A clerical workstation
- Reception
- Staff base
- Reporting Station or Sub-Station
- Dispensing counter
- Sundry.

Part of a typical Staff Station is used as a workbench or workstation. For the Ergonomic Standards of these functions, refer to the appropriate sections of these Ergonomics Guidelines. The balances of the Staff Station Standards are covered below:

2.4.2 High Counter

This is used to shield objects, equipment and records from outside view. They also provide a convenient writing surface for visitors and staff alike. A high counter is also referred to as Parcel Shelf or Service Counter. A high counter used for direct interaction between staff and visitors or patients should be designed to avoid the need for excessive 'reach' across the work surface.

A high counter should be designed in such a way to permit the location of CRT type computer monitors whilst achieving an effective work surface width of 900mm. Alternatively, the high counter should allow for the location of a flat panel display whilst achieving an effective work surface width of 750mm. Where staff need to reach to the high counter to pass or receive documents, the maximum reach to the edge of the high counter shall be 600mm for the relevant section only.

The recommended height of the top counter used against a work surface designed at 720mm above the floor is 1130mm above the floor. This height will allow a typical person to gain sufficient privacy for work whilst being able to look over the top to visitors, standing or sitting. The recommended height to the top counter used against a work surface designed at 900mm to 1000mm is between 1200mm and 1250mm above the floor level.

2.4.3 *High-Low Design*

Where children or visitors using wheelchairs are expected at the Staff Station or Reception counters, a design incorporating a high section (for staff privacy) as well as a low section is recommended. The low section is typically at 720mm above the floor or a height that matches the staff work surface.

2.4.4 *Security Barriers*

In some situations, it may be necessary to provide a security barrier at the counter. This may be in high quality plastics or one of a variety of security glass. These include laminated glass, toughened glass, laminated and toughened glass and glass with a special security film. In such situations, the barrier will include a vertical or horizontal slot that is sufficient to allow the passage of sound and small objects. A slot of 125mm is recommended. If a glazed security barrier is provided at a counter used for public interaction, then an intercom system shall be provided to amplify the sound for the hearing impaired.

At Staff Stations such as Pharmacy Dispensing Counters, it may be necessary to pass larger objects from one side to the other. In such situations, a two-way drawer or cupboard may be used. These should be lockable.

If the Staff Station or counter is the only barrier between a department and outside areas, it may be necessary to provide after-hours security. If a full height barrier such as security glazing has been provided as described, this may be sufficient. Alternatively, a lockable security grille or similar device should be provided. The grill or similar device should be operable by the staff from the normal standing height. If glazing or full height barriers are installed, consideration should be given to the provision of a hearing aid loop, microphones and speakers for communication.

2.5 Workbench

2.5.1 *General*

Workbenches may be designed for two typical work practices – sitting position or standing position. For example, some nursing staff prefer the workbench in a Staff Station to be used in the standing position whilst some staff prefer the sitting position. Both options are equally valid and acceptable. However, the Ergonomic Standards for the two will vary.

2.5.2 *Sitting Position*

A workbench used in the sitting position should be at 720mm above the floor. The typical minimum depth is 600mm. This should be increased to 900mm for the use of conventional CRT computer monitors or 750mm for the use of flat panel computer displays.

2.5.3 *Standing Position*

This position suggests that the primary use of the workbench will be in the standing position. However, allowance may be made for the use of this type of workbench while sitting.

If the bench is almost exclusively used in the standing position with a requirement for occasional typing, then the bench height of 1000mm above the floor is recommended. If the bench is mostly used in the standing position with the occasional typing in the sitting position, then a bench height of 900mm is recommended.

The first option (1000mm) is most often requested for Staff Stations, Reporting Stations and smaller Reception counters. The second option (900mm) is most often used in Utility Rooms, Laboratories, tea benches, kitchens and similar areas.

2.5.4 *Foot Support*

Shorter staff may use footrests in the sitting position to lift the feet to the optimum ergonomic position. Chairs used at workbenches used in the standing position should have foot support rings and be height adjustable. Standing height workbenches where high stools are used should be constructed with built-in foot rests. The footrest should be located 700mm below the height of the counter, and recessed by about 150mm to prevent striking by shins.

2.5.5 *Bench Support*

Many people tend to sit on the edge of the bench from time to time. It is important to support the bench with robust materials to avoid the collapse of the bench and become a danger to users. The support may be gained by using sufficiently thick and sturdy materials such as 32mm fiber board or thinner materials such as 25mm fiber board supported by a steel frame. In any event, the maximum thickness of the bench including any support over the user's knee should be no more than 50mm. Supports should be designed to minimize contact with the user's knees.

2.5.6 *Adjustable Keyboard Shelves*

If a fixed height workstation is selected, adjustable keyboard shelves can provide some flexibility in the provision of height adjustment. The advantages can be summarized as follows:

- Lower keyboard location results in the hands and fingers being straight or leaning slightly forward. This typing posture is considered ergonomically preferred to hands and fingers leaning upward to reach the keyboard
- Lower keyboard can better accommodate shorter staff without changing the height of the entire work surface.

Note: Ideally, the keyboard shelf should be large enough to accommodate the computer mouse.

The following potential problems should be acknowledged:

- Placement of the keyboard is restricted to one area
- The adjustment mechanism below may snag clothing and compromise knee space
- The adjustable support may be too small to accommodate both the mouse and the keyboard, resulting in the mouse being placed on the desk, requiring constant reaching.

On balance, keyboard shelves are recommended for sustained typing only.

2.6 Workstation – Typical

These Guidelines apply to the typical 'L-shaped' workstation as well as desks with or without a return.

A workstation intended for working, writing or typing while in seated position should be 720mm high.

If a computer with a conventional CRT type monitor is used, the depth of the main work surface containing the CRT should be 900mm. If the CRT is positioned in the corner, the 900mm depth is measured diagonally.

If a computer with a flat panel display is used, the depth of the main work surface containing the display should be 750mm. This option is preferred due to the reduced need for the staff to 'reach' across the work surface.

The depth of the return to the main work surface may be between 450mm and 750mm with 600mm being the optimum recommendation. This will allow for under bench storage, file or drawer units.

The optimum recommended configuration for a workstation includes one work surface of 750mm, one work surface of 600mm with the computer position in the corner.

If a computer is positioned in the corner, then the corner should be angled with a minimum dimension of 400mm.

The workstation should be designed to allow for adequate knee space. The space must be large enough so that the action of turning to use under bench units does not result in hitting the knees against these units.

One end of the workstation may be shaped to form a meeting table. For this purpose, rounded edges are recommended.

If visitors are expected to sit across the workstation, then a modesty panel may be considered appropriate.

Workstations should have provision for safe cable management. The simplest system will involve an open tray under the work surface.

In proprietary workstations, power and data points may be internally run with outlets above the work surface. Alternatively, these outlets may be on the adjoining wall at a height of 300mm or 550mm above the floor level with access to the work surface via the cable tray and a plastic cable access cap.

2.7 Computers

2.7.1 General

People tend to use computers in a variety of ways. It is difficult to dictate a particular position to suit all people. The following Guidelines represent the most typical preferences and Standards.

2.7.2 Computer Monitor

The type of monitor will dictate the depth of the work surface. Typically, conventional CRT (Cathode Ray Tube) monitors require greater depth to permit a comfortable distance from the user's eyes. Most IT specialists believe that in the near future almost all CRTs will be replaced by economical flat panel displays using liquid crystal, gas plasma or similar technology. These will require less depth of surface. They are also easier on the eye as they almost eliminate the flicker that is present in CRT monitors. If a choice is available, flat panel displays should be referred to CRT monitors.

2.7.3 *Monitor Position*

Within the work surface depth defined in these Guidelines, the exact horizontal location of the monitor should be adjustable to suit different users. The vertical position of the monitor will depend on the height of the user. The best option is for an adjustable monitor arm. These are, however expensive and are not recommended for all conditions. For most users, a fixed monitor is acceptable. The angle of view to the center of the monitor should be within a range defined by a horizontal line taken from the user's eye down to 15 degrees depending on the user's preference.

2.7.4 *Laptops*

Nothing in this section prevents the use of laptop computers as desktop replacements. This type of computer is acceptable for occasional typing and is recommended for maximum space saving.

2.8 Shelves

2.8.1 *General*

The design of shelves should consider issues of depth, reach, spacing and strength. Shelves described in this section may be in the form of joinery shelf units, strip shelving, upright book cases, metal racks or similar devices. These Standards also apply to shelves within a cupboard.

2.8.2 *Depth (Front to Back)*

The recommended depth for shelves below a workbench is the approximate full width of the bench. The recommended average depth for wall-mounted shelves is 350mm. This will suit wall cupboards in Utility Rooms or over workstations. If a door is provided over the shelf unit, then 350mm will be the total depth.

The recommended depth of shelves for medical records shelving units is 400mm. This depth also allows for metal dividers.

2.8.3 *Reach and Spacing*

A shelf may be installed as low as 150mm above the floor or as high as 1810mm above the floor. Any surface above 1810mm should be regarded as inaccessible without the use of a safe step-ladder.

The recommended starting point of wall-mounted shelves above a work surface designed at 720mm above the floor is 1370mm above the floor. This brings the underside of the shelf to 1350mm above the floor.

The recommended starting point of wall-mounted shelves above a work surface designed at 900mm–1000mm above the floor is 1520mm above the floor. This brings the underside of the shelf to 1500mm above the floor.

A typical medical records storage unit will be a joinery or metal unit 2100mm high with seven shelves starting from 150mm above the floor and finishing with a top shelf at 1800mm.

The recommended depth for wall shelves used for the storage of linen is 450mm, spaced 400mm apart vertically.

Where possible and practical, all shelving should be adjustable. Typically, the first and last shelf in a joinery unit will be fixed.

Note: In heavy use areas of hospitals, the conventional metal pins inserted into joinery walls often

fail. In such situations, proprietary metal strips are recessed into the joinery walls to hold shelf support pins.

2.8.4 *Strength*

Shelves must be designed to suit the weight of the objects most likely to be stored upon them. It should be noted that adjustable shelves are not as strong as fixed shelves. Additional strength may be gained by using thicker and stronger material or by providing an edge downturn.

2.8.5 *Disabled Access*

Shelves designed for use by disabled patients or staff should comply with relevant accessibility Standards.

3.0 Human Engineering

3.1 General

The subject of Human Engineering covers aspects of the design that permits effective, appropriate, safe and dignified use by people including those with disabilities.

The disability Standards and Codes cover certain aspects of design for Access and Mobility for people with disabilities. These are often referred to in these Guidelines and should be followed in relevant areas. Human Engineering for able-bodied persons also requires careful consideration.

Some of the common issues are covered in this section.

There is increased public awareness of barriers that make reasonable utilization of facilities difficult or impossible for the physically impaired. A hospital facility will have a high proportion of occupants, patients and visitors, who are unable to function without some form of assistance. Some staff may also be impaired. To ensure minimum patient dependence on staff, consideration should be given to design provision for optimum patient independence. Consideration must be given to the wide range of disabilities including:

- Mobility impairment
- Visual impairment
- Hearing impairment.

3.1.1 Planning

To minimize overall costs and to avoid the need for expensive modification of finished work, initial designs shall include specific consideration of the needs of the physically impaired. The majority of requirements can be easily accommodated during the planning stage at little or no additional cost; modifications required at a later time may be prohibitively expensive or impractical.

3.1.2 Fixtures and Fittings

Grab-rails, hand-rails, vertical adjustable shower supports, towel-rails, soap holders, footrests and any other fixture that may be used for support shall have sufficient anchorage and strength to resist the sustained concentrated load of a falling heavy human of up to 150kg.

Note: This effectively means that towel-rails should be designed in a similar manner and strength to grab-rails.

3.1.3 Hand Washing – Staff

Location and arrangement of fittings for hand washing shall permit their proper use and operation. Particular care should be given to the clearances required for elbow action type handles. Non-thermal transmitting standard handles are preferred, with effective finger grips. Heights are to suit the particular function, such as pediatric, disabled and standard.

Hand washing facilities shall be securely anchored to withstand an applied vertical load of not less than 115kg on the front of the fixture.

3.1.4 *Staircases and Ramps*

Where ramps are required for patient access, minimum gradients are to comply with the requirements of the Building Codes.

Ramps in other areas such as service roadways shall comply with good design practice and be suitable for the task. If a ramp is unavoidable, the floor covering must be carefully chosen to reduce forces required to move wheeled equipment.

4.0 Signage

4.1 General

Generally, signage should be provided in Arabic and a second language (English). The preferred lettering style is 'Neue Helvetica Arabic' upper and lower case generally. Upper case only is recommended for the building Main Entry Sign. This is not mandatory.

Internationally recognized symbols (pictograms) in lieu of room titles are acceptable.

Sizes of letters in relation to reading distances, mounting heights etc. shall comply with the relevant Standards.

Braille and Tactile signage are recommended for all signs within reach range. There should be a luminance contrast of 30% minimum between the lettering and the background of all signs.

4.2 Bed Numbers

Bed numbers shall be shown outside the patient bedroom. These shall be one number per bed. This is to assist in finding patients, and licensed beds, when appropriate.

In bedrooms with more than one bed, all bed numbers or the range of numbers should be shown on the sign outside the room for example:

- Beds 78 and 79 or
- Beds 78 to 81.

In bedrooms with more than one bed, each bed number shall be displayed at the bed head also.

Bed numbers outside the room must be clearly visible from the corridor and not be obscured by other objects or wall returns.

The provision of a room number is optional. When provided, it should not visually compete with the bed numbers.

Each bed bay in groups of two or more shall have a number that is clearly visible, even with privacy bed screens closed.

4.3 Patient Information

It is no longer recommended to display signs containing information about a patient, such as patient details, doctor identification and special instruction at the patient bed head or in a visible place within the patient bedroom.

This is considered inappropriate due to the requirement for the privacy and confidentiality of patient records. Designers and managers wishing to install patient information holders in the rooms are advised to fully consider the impact on patient privacy.

4.4 Room Signs

Non-illuminated, internal and external room function identification signs that are located on doors require the following considerations:

- The format used should allow easy replacement of the sign or sign inset when the room function changes
- It may be appropriate to deliberately omit signs on certain doors used only by staff.

Special notes may be installed to identify restricted access to certain rooms or departments.

Note 1: Vinyl-cut signs have proved to be a practical and economical option and capable of easy changing over time. However removing them can damage some surfaces.

Note 2: Some signs using removable slats can be easily stolen unless a locking cap is used.

Note 3: Door signs in general are not mandatory.

4.5 Egress Signs

Egress signs shall be installed in accordance with relevant Statutory Codes.

4.6 External Directional Signs

External directional signs shall have white reflective letters on a blue background. The signs shall preferably be of steel or aluminum construction.

4.7 External Illuminated Signs

External illuminated signs for an Emergency Unit shall have white letters on a red background. External illuminated signs for the Main Entry and Night Entry shall have white letters on a blue background.

Note: Emergency Department is referred to as Emergency Unit in these Guidelines. The sign however should refer to 'Emergency'.

4.8 Fire Services Signs

Fire services signs shall be installed in accordance with the Fire Services Codes and Standards

4.9 Internal Signs

4.9.1 Directional Signage

Non-illuminated directional and area identification signs should be as follows:

- Ceiling or wall-mounted
- Text on contrasting background – dark lettering on light background preferred
- A guide for the patient or visitor until they reach a room or door sign for the intended destination
- Not obscure other critical ceiling fixtures such as emergency lighting or fire exit signs.

Serious consideration should be given to the provision of alternate low-level signs in Braille (as well as plain text) in Hospital Entrance Foyers leading to major departments, lifts and public amenities. It is recommended that such signs be installed immediately above the hand-rails.

4.10 Door Numbers

Door/frame numbering or tags may be required by the management for easy maintenance. This is a separate concept to room signage showing the function or the room. Door numbering is not mandatory. Unlike room signs, door numbering may be small and unobtrusive.

4.11 Miscellaneous Signs

Miscellaneous signs, illuminated and non-illuminated are to be provided as required. These could include illuminated 'X-Ray Room in Use' signs. The colors used should meet the requirements of the relevant code or regulating authority.

4.12 Road Markings

Road markings such as parking bays, arrows, symbols and instructions should be white generally, blue for disabled and yellow for restricted zones.

4.13 Street Signs

Street signs shall be in accordance with the requirements of the Municipality and/or the appropriate section of the state roads and traffic authority.

Accreditation Standards usually require that the facility have street directional signs sufficient to enable it to be easily located from the major access road in the area.

The Emergency Unit, if provided, will require an illuminated sign that is clearly visible from the entrance to the Hospital site.

5.0 Doors

5.1 Door Swing

Doors shall not swing into corridors in a manner that might obstruct traffic flow or reduce the required corridor width. This applies only to doors subject to constant patient or staff usage. Where doors need to swing out into corridor they should be set in a recess.

5.1.1 *Doors in the Path of Fire Egress*

All doors on the path of fire egress shall be single or double swing type. These shall comply with the requirements of NFPA 101 Fire and Life Safety Codes, (Note: if such doors also form part of a fire or smoke compartment, they shall maintain those properties in the closed position).

Sliding doors may be used for exit doors opening directly to the outside if an approved failsafe system is provided to open the door in case of fire.

5.1.2 *Doors Used by Patients*

Doors to rooms that are likely to be used by patients without staff assistance should be single or double-swing type.

Swing doors should generally open from corridors and distribution spaces into rooms. The exceptions are as follows:

- Doors to small patient Ensuites should generally open out
- Doors to disabled toilets and showers should open out
- Doors to small change cubicles should open out
- Doors subject to the requirements of 'Emergency Access' shall open out or open in both directions.

Clear door openings between two sections of a corridor or from one corridor to another shall be as specified by the relevant building Codes and Standards for doors in the path of fire egress. In effect, for the purpose of these Guidelines all corridors are on the path of egress.

5.2 Door Width

The minimum dimensions of clear door openings to patient bedrooms in new areas shall be 1200mm wide and 2030mm high. In patient care and critical care areas likely to be used for bariatric patients or for additional bulky equipment in the room, provide a minimum clear opening dimension of 1400mm width to allow for large bariatric sized beds exceeding 1200mm width and other equipment such as patient lifting devices. Existing doors of lesser dimensions may be considered acceptable where function is not adversely affected and replacement is impractical.

In general, clear door openings to rooms that may be accessed by stretchers, wheeled bed stretchers, wheelchairs or handicapped persons, shall be a minimum of 900mm. For situations such as hoists and shower trolleys, 1000mm is recommended.

While these Standards are intended to facilitate access by personnel and mobile equipment, consideration must be given to the size of furniture and special equipment that is to be delivered via these access ways.

5.3 Emergency Access

Certain rooms that are used by patients shall be equipped with doors and hardware that will permit emergency access from the outside. These rooms can be defined broadly as follows:

- Rooms that are used independently by patients, have only one door and are smaller than 6m²
- Rooms where there is less than 2.5m of clear space behind the single door
- Patient bedrooms, Bathrooms and Ensuites in mental health facilities, or mental health components of other health facilities
- Secure rooms in mental health facilities.

When such rooms have only one opening, the door shall be capable of opening outwards or in a manner that will negate the need to push against a patient who may have collapsed within the room. In other words, if the door normally opens inwards, in case of emergency the staff must be able to open the door outwards without any need to use a key, Allen key or special device.

These Guidelines recommend the use of retractable door-stops within flat metal door frames together with coin operated door snibs. The snib can be opened with a coin while the door can be opened outward by simply pushing the door-stop into the frame.

Important note: This requirement cannot be satisfied by any of the following alternatives:

- Cavity sliding doors
- Sliding doors on the inside of the room.

In all areas except Mental Health Secure Rooms, surface sliding doors installed on the outside of the room may satisfy the requirements of this clause. This can be achieved if:

- The door can be easily and safely removed off the track
- Door removal is not prevented by the door locking mechanism.

Notwithstanding the above possibility, manual sliding doors are not recommended by these Guidelines for any area of Hospitals or Day Procedure Centers.

In Mental Health Secure Rooms, the following configuration is mandatory:

- One standard door, opening in
- One adjacent door minimum 450mm wide, opening out
- Both doors with external locks and fully recessed internal handles.

5.4 Door Handles

5.4.1 General

The following considerations shall be given to the particular hardware requirements and special fittings needed for certain areas.

5.4.2 Door Handles Generally

In areas where staff frequently pass doors, serious consideration should be given to the shape of the door handle so that it is not caught by the pockets in overalls. Handles with a full return are recommended.

5.4.3 Mental Health

Door handles in a Mental Health Unit shall prevent self-harm by not providing a supporting point. This can usually be achieved by using recessed, concealed or flush hardware. Alternatively, specially formed knobs are available which do not allow 'hanging'.

5.4.4 *Shared Ensuites*

Ensuites that are shared by two patients shall incorporate hardware to automatically lock one door and indicate 'Room Occupied' if the other door is operated. Both doors shall be unlocked once one of the doors is opened from inside.

5.4.5 *Pediatric Rooms*

In Pediatric Rooms, consideration should be given to providing two sets of door handles one at high level and one at low level.

Door handles may incorporate locks, snibs, push buttons and indicators. Designers and specifiers should be advised to consider flexible hardware systems where the functionality of the door may be changed without necessarily changing the hardware.

The type of locking function shall be appropriate for the use of the room. In any event, the locking device shall prevent a person being inadvertently locked in a room, and shall be openable from inside with a single action.

5.4.6 *Push/Pull Plates*

In many instances, a door lock or latch is not necessary. Rooms that do not require locking may work well with only push/pull plates and a self-closer. Push/pull plates are recommended in rooms that are used frequently by staff holding objects in their hands. Dirty Utility Rooms are a good example.

5.5 Door Grilles and Undercuts

The Heating, Ventilation and Air-Conditioning (HVAC) design may require door grilles or undercuts. These are usually required for return air, makeup air or pressure relief.

Door grilles or undercuts may be used in areas that do not compromise the requirements of the building Codes and Standards and other requirements of these Guidelines. These may include:

- Areas with a particular air-pressurization scheme
- Isolation Rooms
- Room requiring acoustic isolation
- Rooms requiring radiation shielding.

The following non-mandatory recommendations also apply to grilles and undercuts:

- Door grilles are not recommended for areas used by people in wheelchairs due to potential impact and damage
- Door grilles are not recommended for bathrooms or Ensuites
- Large undercuts close to bathroom showers are not recommended as they can result in water leaking outside to adjoining rooms
- As an alternative to a door undercut, designers may consider an inward sloping door slot approximately 200mm above the floor to reduce water egress whilst providing the same functionality as a door undercut.

5.6 Hold-Open Device

Door hold-open devices should also be considered for doors that should remain open, such as doors on main traffic routes and delivery doors. The following requirements shall apply:

- Hold-open devices shall be capable of activation and de-activation without any need for the staff to bend down
- Hold-open devices shall not be fitted to doors where this compromises fire doors, smoke doors or other doors that are required to achieve a specific air pressurization or isolation scheme by these Guidelines
- Hold-open devices shall not be fitted to the side of a door that may permit a disturbed patient to lock the door from inside.

In areas frequently used by staff holding objects or pushing trolleys, the use of delayed action, combined self-closer/hold-open device is recommended.

5.7 Self-Closers

5.7.1 General

Self-closers are required for fire and smoke doors nominated in the Building Codes and Standards and shall comply with its requirements. This section covers other door types including:

- Doors required to achieve a certain airflow or air pressurization scheme required by these Guidelines
- All air locks, with or without an air pressurization scheme
- Entrance doors to any area nominated as a restricted area by these Guidelines including:
 - o Operating Unit
 - o Sterile Supply Unit
 - o Catering Unit
 - o Sterile Stock Rooms
- Isolation Rooms
- Birthing Rooms
- Dirty Utility Rooms.

Apart from the above doors, self-closers are not required or encouraged. Indeed an over-provision of self-closers can lead to unnecessary capital and maintenance costs.

Self-closers to the following rooms are discouraged:

- Offices
- Patient Rooms
- Bathrooms and Ensuites
- Rooms used independently by people with disabilities
- Meeting Rooms and Interview Rooms.

5.7.2 Hardware

Self-closers shall be designed and installed to allow for the door opening a full 90 degrees. The nib space required for the self-closer arm should be considered.

Self-closers used in double doors shall be accompanied by suitable sequencer hardware to allow the doors to be closed in the right sequence. Self-closers that duplicate the functionality of a hold-open device may also be considered.

5.8 Observation Glass

Glazed panels shall be provided in doors where visual observation for reasons of safety, security or patient observation is required. However, in fire doors the size must comply with the Protection of Openings in Fire Resistant Walls in the relevant building Codes and Standards.

Observation glass is recommended in the following areas:

- Entry/exit doors to Operating Rooms or Procedure Rooms
- Doors from Scrub Rooms to Operating Rooms
- Doors to air-locks
- Doors to Clean and Dirty Utility
- Work Rooms frequently used by staff
- Doors to rooms used to interview mental health or disturbed patients
- Doors to rooms requiring an observation window but with no physical possibility of providing a window
- Doors to Kitchens and Pantries.

Observation glass is not recommended in the following areas:

- Doors to patient bedrooms generally
- Doors to rooms requiring acoustic isolation
- Doors to Mental Health Secure Rooms
- Doors to rooms resulting in an invasion of patient or staff privacy.

Observation glass shall have a mechanism, device or material to protect the glass in the following areas:

- Operating Rooms and Procedure Rooms where laser may be in use
- Rooms requiring X-Ray or other radiation shielding
- Rooms requiring electromagnetic shielding (such as a Faraday Cage).

Observation glass may be semi-frosted in areas where a clear vision of the room is not required. This type of glass or applied film may suit rooms where the primary concern is to avoid danger to staff passing through the door. Semi-frosted glass is usually adequate to enable staff to avoid the danger. Semi-frosted glass is recommended in doors to the following rooms:

- Clean Utility
- Dirty Utility.

5.9 Automatic Doors

Beam activated automatic sliding or swing doors are considered highly desirable in high traffic areas such as Main Entrances and delivery points.

They may also be used successfully in areas where 'hands-off' access is necessary, such as entries to an Operating Unit. Where installed, they are to satisfy the requirements of emergency egress and to close at a rate that provides sufficient time for disabled and frail patients and visitors to enter/exit.

Automatic doors are not mandatory.

5.10 Sliding Doors

Sliding doors may be used subject to compliance with the building Codes and Guidelines and the following mandatory requirements.

Cavity sliders may not be used in the following areas:

- Planning units containing Patient Care Areas or Treatment Areas
- Planning units containing sterile equipment
- Planning units containing patient diagnostic equipment
- Catering Facilities
- Laboratory Areas
- Mental Health facilities.

Surface sliding doors may be used subject to the requirements of 'Emergency Access'.

Note 1: Generally, these Guidelines do not recommend the use of sliding doors in health facilities due to a number of reasons including hygiene concerns, maintenance problems and potential for locking in place.

Note 2: Sliding doors, if used should be of solid core or metal frame type to resist warping and therefore locking. Sliding doors should have tracks on top and bottom to ensure safety of operation.

6.0 Grab-Rails and Hand-Rails

6.1 General

6.1.1 Continuity

In corridors accessed by patients, a grab-rail to one side is mandatory.

Depending on the plan, the following will apply:

- The hand-rail should be on the side of the wall leading to the majority of rooms or areas related to patients
- If the continuity of the grab-rail is interrupted due to a large number of doors placed in close proximity, a grab-rail should be provided to the opposite wall, at least for the length of corridor affected.

The height of grab-rails and hand-rails in corridors will comply with Accessibility Standards for Corridors.

6.1.2 Lifts

Hand-rails shall be provided in lifts used for patient, staff and visitors, to at least one side.

6.1.3 Prevention of Self-Harm

In certain areas such as Mental Health Units, grab-rails may present the possibility of self-harm by providing points of ligature.

Depending on the Operational Policy, corridor hand-rails in Mental Health Units shall be designed in such a way that the space between the base of the hand-rail profile and the wall is blocked. This arrangement does not totally eliminate the ligature point, but it makes it impossible to tie an object around the rail.

6.1.4 Outside Corners

Hand-rails meeting outside wall corners should be either continuous around the corner or set back from the corners by approximately 100mm. This is to minimize the chance of the rail grabbing onto clothing, especially large pockets. Any hand-rails continuing around 90 degree corners shall be rounded to avoid a dangerous sharp edge.

7.0 Windows and Glazing

7.1 General

All rooms occupied by patients or staff on a regular basis shall have glazed windows or doors to achieve external views and/or make use of direct or borrowed natural light, where practical.

All patient bedrooms shall have external windows overlooking external areas. An external area is defined as the perimeter space around a building as well as naturally ventilated and lit atriums and courtyards.

Note 1: It is also a requirement of these Guidelines that all overnight patient bedrooms must have an external window. This however does not apply to the Operating Unit, Emergency Unit, ICU and similar areas.

Note 2: For the purpose of this clause, an internal atrium with artificial ventilation will be accepted if the area is more than 220m² with a minimum dimension of 14m and suitable permanent landscaping.

7.2 Window Types

7.2.1 Fixed/Openable Windows

In multi-level hospitals with ducted air-conditioning systems, or in buildings in cyclone prone areas, it is not always possible to include an openable window component. In these circumstances, fixed windows are acceptable, although access for external window cleaning should be considered.

Openable windows should have provision to restrict the degree of opening. Locks should be heavy duty, affixed to both sides of hopper windows and fixed securely through the frame with tamper proof fixings.

Hopper windows should not be used in multi-story buildings because they can act as smoke/heat scoops from fires in story's below.

Note: Hopper windows are also known as 'awning' windows. These refer to windows hinged from the top.

7.2.2 Windows in Mental Health Areas

Internal windows and observation panels in mental health areas that could be accessed by patients shall be safety glass, specifically, toughened laminated glass with a minimum nominal thickness of 10.38mm, or equivalent approved. Internal windows shall be double-glazed. Windows and frames in patient accessed areas are to be flush faced.

7.3 Size

Each required external window and/or external glazed door shall have a net glazed area of not less than 10% of the floor area of the room concerned. An opening component not less than five% of the floor area of that same room is considered highly desirable but not mandatory. These requirements together will ensure natural light and ventilation in the event of an electrical or air handling system failure.

If it is considered undesirable to allow patients to open windows, for reasons such as avoiding potential problems with the central air-conditioning, then the opening section of the windows should be operated with a lock or Allen key held by the staff.

Note 1: Any opening section of the window or door as described above shall be provided with a fly

screen.

Note 2: The provision of opening windows also facilitates energy management and conservation as artificial lighting and air-conditioning systems may not be necessary at certain times of the day and year.

7.4 Cleaning

Window cleaning shall be considered and appropriate provisions made. The following options are provided for information:

- Inward opening windows allow for the cleaning of the outside surface in a safe manner while standing inside the building
- With alternate outside opening windows it is possible to open one window to reach and clean the next window; however this type of window will require secure harness anchor points for the cleaner
- A window cleaning ledge or balcony may be provided only for window cleaning with no patient access. If no hand-rail is provided, a continuous harness system shall be provided with a harness cable or rail that must reach a safe access point
- A window cleaning cradle that typically descends from the roof may be used. Cradles must be accessible from a safe position on the roof and comply with all safety legislation
- Extension arms may be used to clean windows that are one level above the ground or accessible terrace
- Hospital management may enter into a window cleaning contract with a contractor who uses a mobile cherry pickers or similar lifting device.

Note – For safety reasons, cleaning windows using a ladder is not recommended.

8.0 Floors

8.1 Floor Finishes

8.1.1 General

Floor finishes have an impact on various requirements of these Guidelines.

Part D covers those aspects that affect Infection Control issues. This section (Part C) covers those aspects that affect Access, Mobility, Occupational Safety and Health.

The selection of floor finishes is very important. It has direct impact on the safety of patients, staff and visitors. The choice also has potential legal implications if not correctly addressed.

Fire safety compliance is also a special consideration. A 'duty of care' exists where professionals such as architects and interior designers are involved in the selection of products and responsibility must be addressed by purchasing officers and retailers/agents when purchasing replacement products. Floor finishes also have a direct impact on the whole of life costs of any building where cleaning and maintenance is concerned. This is especially true in a Hospital. Low capital cost may result in high whole of life costs.

8.1.2 Balance of Considerations

A number of issues should be considered and balanced when making the choice of floor finish. Designers are encouraged to investigate alternative materials and if necessary organize for realistic onsite tests before making major decisions. The following are general guides to making this decision.

8.1.3 Movement of Objects

The floor finishes chosen should make the movement of such objects as trolleys, bed trolleys and wheelchairs sufficiently easy to minimize the potential for back injury to staff.

The following should be considered when selecting floor finishes:

- Standard vinyl and similar products are the easiest materials for the movement of trolleys and wheelchairs
- Carpet, if used, should be direct stick, commercial density with short piles, preferably loop piles; a 90/10 or 80/20 wool/nylon mix is recommended
- Flocked carpet should be considered where the 'look and feel' of carpet is desired with the ease of movement over vinyl
- Many hospital staff consider that it is harder to move objects over cushioned vinyl. However, cushioned vinyl may still be preferred to standard vinyl for its sound absorption qualities.

8.1.4 Noise Generation and Sound Absorption

Carpet type finishes not only minimize noise generation, they also dampen the noise generated by other sources. Carpet is particularly effective in corridor areas outside patient bedrooms where a great deal of noise can be generated. This quality should be balanced against the ease of movement by trolleys, bed trolleys and wheelchairs.

Cushioned vinyl is also effective in minimizing noise generation but it does not dampen other noises as effectively as carpet.

Ceramic tiles, Terrazzo and similar hard surfaces generate noise from walking staff and visitors.

8.1.5 *Easy on the Foot*

Surfaces such as carpet and vinyl, both standard and cushioned are considered easy to stand on for long periods of time. Most OSH experts consider surfaces such as ceramic tiles and terrazzo too hard to stand on for more than a few hours. These are therefore not recommended in hospital work areas. However, they may be used in public areas such as foyers and courtyards.

Floor materials shall be easy to clean and have wear resistance appropriate for the location involved.

Floor finishes that are subject to traffic whilst wet such as showers and bathrooms, kitchens and similar work areas shall be capable of maintaining a nonslip surface.

Note: The same applies to dry floors subject to the presence of fine powder such as baby powder.

Floor finishes for staircases should be slip resistant and comply with fire safety requirements. Stone and terrazzo may be used, however, when wet, worn or poorly maintained these finishes may present a danger to staff and visitors from slips, trips and falls. Consideration may be given to application of proven, proprietary non-slip chemical or other treatments to the surface. If stone finish is to be used, an anti-slip strip is to be used.

8.2 Anti-Static/Conductive Flooring

A distinction must be made between anti-static and conductive flooring. Anti-static flooring reduces the risk of static occurring while conductive flooring absorbs the electrical charge. However, if rubber soled shoes are worn on conductive flooring the effect is negated.

In the past, anti-static flooring was required in Operating Rooms because of the use of flammable anesthetic agents. These types of anesthetics are no longer in use, so the requirement for this type of specialized flooring no longer applies.

In addition, anti-static flooring is expensive, both to install and maintain. Most public and staff areas do not pose a problem with respect to generation of an electrical charge. Where there is any possibility of such an event, for example a computer technician working inside a computer or a worker in a specialized micro-electronics laboratory, use is made of anti-static mats that more than adequately provide the necessary barrier.

If there are areas and rooms in which flammable anesthetic agents are stored or administered to patients, floors shall minimize combustion hazards arising from the medical use of flammable anesthetic agents

Conductive flooring may be omitted in anaesthetizing areas where flammable anesthetic agents will not be used and appropriate notices are permanently and conspicuously affixed to the wall in such areas and rooms. Otherwise, appropriate conductive flooring shall be provided.

In summary, anti-static or conductive flooring are not mandatory in any part of the hospital. Any special requirement may be noted specifically on the Project Brief.

8.3 Slip Resistance

Slip resistance is governed by the nature of the anticipated activity. In equating safety, consideration must be given to all the relevant variables; slip potential is a function of footwear, activities, gait, contamination, environment and other factors.

The choice of floor finish shall consider the slip resistance appropriate for different conditions. The following can be used as a guide:

- Standard vinyl is suitable for dry areas where patients and staff are expected to wear shoes (Standard – Dry)
- Standard Textured Vinyl is similar to standard vinyl but provides greater dry condition slip resistance (Standard/Slip resistant)
- Studded vinyl flooring balances slip resistance with ease of cleaning, and is suitable for wet areas such as patient showers where water, soap and body fat are present (Non-Slip)
- Safety vinyl flooring that suits wet areas without soap or body fat where trolley movement is also expected, such as CSSU Decontamination Areas and Dirty Utilities (Extra Non-Slip)
- Ceramic tiles can be used for Ensuites and Bathrooms, but not clinical areas requiring seamless finishes. Smaller ceramic tiles generally provided greater slip resistance. The best combination of slip resistance and easy cleaning is commonly referred to as 'Orange Peel'.

Stone and terrazzo are sometimes used in entrance foyer areas; however, on rainy days these finishes may present a danger to staff and visitors and in such circumstances proprietary non-slip chemical treatments shall be used to increase slip resistance.

Design considerations include:

- Floor finishes and floor finish characteristics (wear resistance and cleanability)
- The amount and type of expected traffic (vehicles, trolleys, people hurrying, elderly, disabled people with or without walking aids and children)
- Consequences of exposure to contaminants including environmental design factors (visibility issues and contamination minimization)
- Management policy and maintenance practiced (frequency, type and effectiveness of cleaning equipment)
- Compliance with Occupational Safety and Health requirements
- Special provision for slip hazards (guards and rails)
- Alternative information sources (use of contrasting colors, tactile indicators and warning signs).

8.4 Floor Joints

Thresholds and expansion joint covers shall be flush with the floor surface to facilitate the use of wheelchairs and trolleys. Expansion and seismic joints shall be constructed to resist passage of smoke.

9.0 Acoustics

9.1 General

The design and construction should address acoustic aspects of the work environment. The major design issues to be considered include:

- Workplaces should be designed to minimize the occupant's exposure to noise; noisy machines and activities should be remote or isolated from other work areas
- Noisy equipment should be acoustically enclosed where practicable
- Noisy work areas such as workshops should have acoustically absorbent ceilings to reduce the amount of noise other staff working nearby are exposed to
- Noise levels of equipment should be an integral part of equipment selection/purchasing procedures
- Consideration should be given to the impact of ultrasonic noise generation.

Specialist advice from a qualified Acoustic Engineer is recommended.

9.2 Recommended Provisions

The Engineering Services and the building components should be selected to achieve an acceptable noise level. Unless other requirements are stated in other parts of these Guidelines, the ambient sound levels should not exceed those stated by local regulatory authorities.

9.2.1 Recommended Design Sound Levels

ROOM/SPACE	Satisfactory dB*	Maximum dB*
CASUALTY AREAS	40	45
CORRIDORS AND LOBBIES	40	50
CONSULTING ROOM	40	45
DELIVERY SUITES	45	50
DENTAL CLINICS	40	45
ICU	40	45
KITCHENS	50	55
LABORATORIES	45	50
STAFF STATIONS	40	45
OFFICE AREAS	40	45
OPERATING THEATRES	40	45
PHARMACY	45	50
STERILISING AREAS IN OPERATING THEATRES	40	50
INPATIENT WARDS	35	40
WAITING ROOMS AND RECEPTION AREAS	40	50

* dB = Decibel

9.2.2 Recommended Construction STC Ratings

ROOM/SPACE	Minimum STC	Recommended STC	Recommended Wall Types
CENTRAL STERILE SUPPLY UNIT	50	55	Type 5
CONSULT ROOM	40	45	Type 3
CORRIDORS/LOBBIES	40	50	Type 4
DENTAL SURGERY	40	45	Type 3
EMERGENCY UNIT	40	45	Type 3
ICU/SPECIAL CARE	35	40	Type 2
INPATIENT BED ROOMS	35	45	Type 3
INTERVIEW ROOMS		45	Type 3
KITCHEN	50	55	Type 5
LABORATORIES	45	50	Type 4
LOUNGES		40	Type 2
MEETING/CONFERENCE ROOMS		45	Type 3
OFFICES – EXECUTIVES	40	45	Type 3
OFFICES – GENERAL	35	40	Type 2
OBSTETRIC UNIT	45	50	Type 4
OPERATING UNIT	40	45	Type 3
OPERATING UNIT STERILISING AREA	40	45	Type 3
PHARMACY UNIT	45	50	Type 4
QUIET ROOMS		45	Type 3
RECEPTION	40	50	Type 4
RECOVERY AREAS		45	Type 3
REHABILITATION UNIT	40	45	Type 3
SPEECH THERAPY		45	Type 3
STAFF STATIONS	40	45	Type 3
TREATMENT ROOMS	40	45	Type 3
TUTORIAL ROOMS		45	Type 3
WAITING AREAS	40	50	Type 4

STC = Sound Transmission Coefficient

9.2.3 Typical Wall Types

Typical dry wall types capable of achieving the above ratings are listed below; these are not mandatory and are subject to correct detailing and construction.

Type 1 – STC Rating – 35

Standard grade plasterboard 13mm thick (minimum mass); 8.5g/m² each side of 92mm steel studs.

Type 2 – STC Rating – 40

Two options are available:

- Two layers of 13mm thick standard grade plasterboard one side of 92mm steel studs, one layer of 13mm thick standard grade plasterboard on the other side
- One layer 13mm thick standard grade plasterboard on each side of 92mm steel stud. Cavity infill of:
 - o 60mm (500g/m²) polyester
 - o 50mm (10kg/m³) glass wool.

Type 3 – STC Rating – 45

Two layers of 13mm thick standard grade plasterboard on one side of 92mm steel studs, one layer of 13mm thick standard grade plasterboard on the other side.

Cavity infill of:

- 60mm (500g/m²) polyester
- 50mm (10kg/m³) glass wool, or
- Light or heavy Masonry.

Type 4 – STC Rating – 50

Two layers of 13mm thick standard grade plasterboard each side of 92mm steel studs. Cavity fill of:

- 70mm (600g/m²) polyester
- 75mm (10kg/m³) glass wool.

Type 5 – STC Rating – 55

Staggered stud system using two layers thickness of standard grade plasterboard each side of 92mm studs and 92mm tracks.

Cavity infill of:

- 70mm (600g/m²) polyester
- 75mm (10kg/m³) glass wool.

Where a high degree of impact/abrasion resistance is required, such as in Hospital corridors, a 9mm thick fibrous cement sheeting may be substituted for 13mm thick standard grade plasterboard. The acoustical performance for 9mm fibrous cement sheet approximates that of 16mm thick fire grade plasterboard.

The maximum sound rating achievable for partition construction to the underside of a continuous plasterboard ceiling is STC 40. If a layer of 75mm, thick polyester or glass wool 2400mm wide is provided over the ceiling on the partition below, a sound rating of STC 45 is achievable. Partitions with sound ratings above STC 45 must be constructed full height from floor slab to underside of floor slab.