

DHA Health Facility Guidelines 2019

PART C – Access, Mobility, OH&S





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Introduction

Part C – Access, Mobility and OH&S of the Dubai Health Facility Guidelines covers healthcare facility specific requirements to ensure they are safe and functional for staff, patients and the wider community. All components of the Dubai Health Facility Guidelines, Part A through to Part F, endeavour to provide relevant authorities, investors and designers with the necessary information to deliver optimal, safe and efficient healthcare facilities which meet the Dubai Health Authority's requirements.

The planning requirements for health facility development have been covered in Part B of the Dubai Health Facility Guidelines. This Part focuses on the design components which collectively equate to healthcare facilities which meet international standards of space standards, human engineering, ergonomics, accessibility, adequate signage and safety and mobility requirements.

Space standards and dimensions outline the size requirements of corridors to ensure safe and functional paths of travel which take into account, patients, staff and equipment. Ceiling height requirements, department size and efficient circulation percentages are also detailed to ensure optimal unit sizing. Human engineering describes the requirements (height, placement and reinforcement) of facilities fixtures and fittings such as handrails, handwash basins and ramps. Ergonomics seeks to provide optimal standards for built environments including staff stations, workbenches and shelving to ensure the safety of both patients and staff.

This Part also addresses the suitability requirements of doors used throughout a healthcare facility as well as door parts (locks, handles) which have specific requirements dependent on the FPU in which they occur. Flooring is another integral component of healthcare facility overall safety and differing areas having differing requirements, finishes, joinery and slip resistance.

When complied too, these guidelines and requirements work to ensure that healthcare facilities are a safe environment in which risks of further harm, injury or illness are reduced. Mobility, accessibility and OH&S standards should be regularly reviewed, regulations implemented, and standards upheld through the process of health and safety education. It should be noted that all parts of these guidelines must be taken into consideration in the design of health facilities.



Disclaimer

Although the quality of design and construction has a major impact on the quality of health care, it is not the only influence. Management practices, staff quality and regulatory framework potentially have a greater impact. Consequently, compliance with these Guidelines can influence but not guarantee good healthcare outcomes.

Compliance with these Guidelines does not imply that the facility will automatically qualify for accreditation. Accreditation is primarily concerned with hospital management and patient care practices, although the design and construction standard of the facility is certainly a consideration.

The Dubai Health Authority will endeavour to identify for elimination any design and construction non-compliances through the review of design submissions and through pre-completion building inspections, however, the responsibility for compliance with these Guidelines remains solely with the applicant.

Any design and construction non-compliances identified during or after the approval process, may need to be rectified at the sole discretion of the Dubai Health Authority at the expense of the applicant.

Therefore, the Dubai Health Authority, its officers and the authors of these Guidelines accept no responsibility for adverse outcomes in Health Facilities even if they are designed or approved under these Guidelines.

These Guidelines are not exhaustive and do not cover every eventuality that may or may not occur in the design, commissioning, operation or decommissioning of the health facility. Where there is conflict between DHA-HFG and existing laws, the latter takes precedence.

Live Documents as published on the DHA-HFG website should always be the only source of reference. Printed / downloaded version could go dated as revisions are published on the website.



Structure of the Guidelines

These Health Facility Guidelines are divided into 6 volumes in order to present information in a comprehensive and logical sequence and avoid unnecessary duplication of information between sections:

Part A Administrative Provisions

- Approval process for Health Facility Licensing
- Prequalification of Health Facility Design Consultants
- Standards and Guidelines applicable to planning and engineering

Part B Health Facility Briefing and Planning

- Planning guidelines
- Role delineation level
- Functional Planning Unit incorporating Description of each Unit
- Functional Relationships with diagrams
- Schedule of Accommodation for typical units
- Standard Components Room Layout Sheets and Room Data Sheets

Part C Access, Mobility, OH&S and Security (this part)

- Space standards
- Human Engineering
- Ergonomic considerations
- Accessibility requirements
- Signage guidance
- Safety and mobility considerations for floors, grab rails, doors, windows



- Part D Infection Prevention and Control**
- General principles applicable to health facilities
 - Hand hygiene
 - Sources of Infection
 - Isolation Rooms
 - Surfaces and Finishes
 - Construction and Renovation

- Part E Engineering - Building Services**
- Electrical / ELV & ICT
 - Mechanical (HVAC)
 - Water Systems
 - Drainage Systems
 - Medical Gas Systems
 - Fuel Systems
 - Pneumatic Tube Systems
 - Fire Protection Systems (Special Areas Only)
 - Applicable Standards

- Part F Feasibility Planning and Costing**
- A framework related to Part A licensing and methodology covering
- Needs analysis
 - Risk Analysis
 - Funding strategies
 - Procurement strategies

Each part includes relevant guidance and reference material for readers to obtain further information.



1. Terms & Abbreviations

Abbreviations used in this volume include:

Abbreviation	Meaning
CCU	Coronary Care Unit
CRT	Cathode ray tube monitors
HDU	High Dependency Unit
ICU	Intensive Care Unit
FPU	Functional Planning Unit
Kg	Kilogram
M	Metres
mm	Millimetres
m ²	Square metres
MRI	Magnetic Resonance imaging
OH&S	Occupational Health and Safety, also referred to as OSH, Occupational Safety and health in some jurisdictions
SSU	Sterile Supply Unit



2. Space, Standards & Dimensions

2.1 Corridors

There are many schools of thought on minimum corridor widths and the underlying principles that should dictate them. This section includes the recommended minimum requirements with consideration given to the need to allow for the movement of mobile equipment such as trolleys, beds, wheelchairs, motorised carts etc. including the allowance for equipment to pass in opposite directions.

A key principle in establishing the minimum corridor width is the requirement to allow a width that will not restrict egress in the event of an emergency evacuation procedure.

In particular designers should note the following:

- Other Building Codes, such as UAE Fire and Life Safety and Dubai Universal Design Code, may also specify minimum corridor widths for Patient Care Areas with a focus on fire safety or access for people with determination. The requirements of these Guidelines for certain areas may be higher than codes such as Fire Safety or Accessibility as these Guidelines are concerned with a broader range of issues
- Hospitals may be planned with clearly designated staff-only and patient corridors; the requirements for patient corridors will not apply to staff only accessed corridors.
- All corridor widths identified are clear of hand rails and/ or crash rails or other items such as drinking fountains, hand basins, telephone booths, columns, vending machines and portable/mobile equipment. Equipment bays and obstructions located in corridors must not impede the traffic flow. An allowance of 100mm is recommended for handrails.
- Consideration should be given to the elimination of potentially dangerous 'blind spots'.

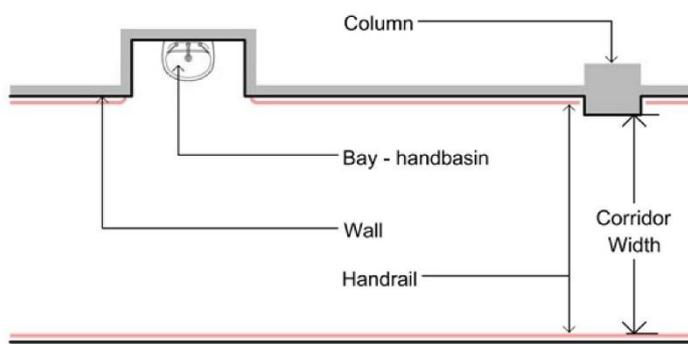


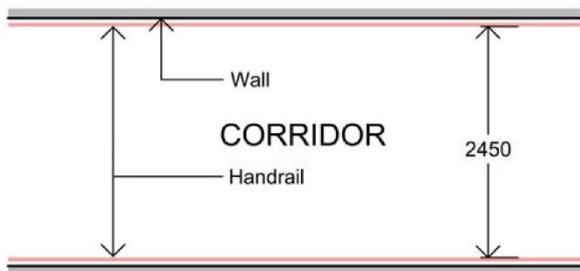
Figure 2.1: Corridor Plan – width clear of handrails and obstructions



2.1.1 Patient Corridors

In patient areas such as Inpatient Units, Operating Units and Intensive Care Units, where beds, trolleys and stretchers will be moved regularly, minimum clear corridor widths of 2450mm are recommended.

Refer to Figures 1.2 and 1.3 below.



Above: Figure 2.2: Corridor plan showing minimum clearance

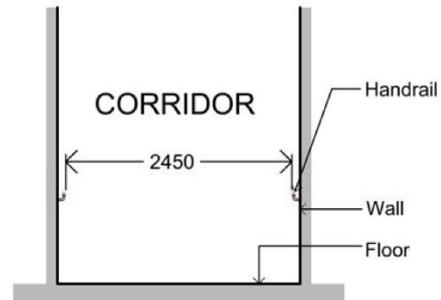


Figure 2.3: Corridor section

In Outpatients Unit, whether stand-alone or part of a Hospital, the minimum corridor width is 1850mm clear.

In all corridors special consideration must be given to the width of doorways into connecting rooms. Corridors may need to be widened at the entry to rooms to allow for beds/ trolleys to turn into the room.

Where an existing building is being redesigned, corridor widths that are smaller than the recommend dimensions may be permitted. However special consideration should be given to emergency egress and evacuation.

Note: Whatever building conditions prevail, any corridors which may be used by a patient for any purpose should not be less than 1850mm wide.

Corridors where irregular bed or trolley traffic is anticipated, such as Radiology, can be reduced to 2000mm clear width. In this case however special consideration must be given to door widths or local corridor widening to ensure the movement of beds or trolleys from corridor to connecting rooms is not restricted.

Corridor widths to permit turning are demonstrated in the diagrams below.

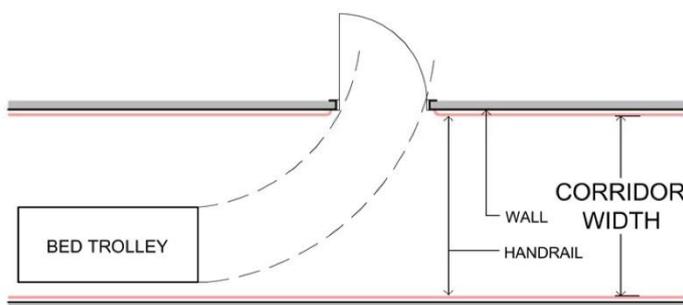


Figure 2.4: Corridor width permits turning into a room



In the figure shown above, corridor width is sufficient for a bed trolley can be manoeuvred to enter a room for which the entry door is located on corridor wall.

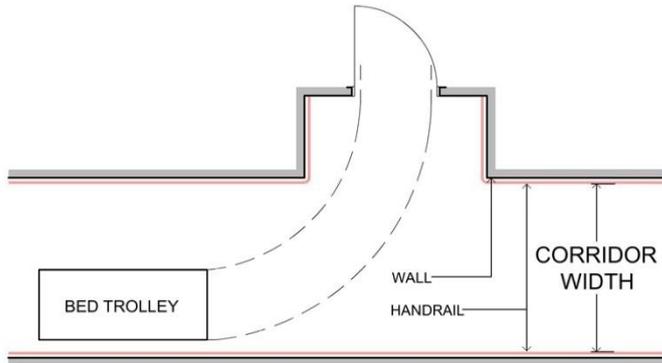


Figure 2.5: Corridor with recessed door entry to allow for turning

In the figure shown above, where the corridor width is not sufficient to allow a bed trolley to turn into a room, a recessed entry door is provided.

Alternatively, in the figure shown above, where the corridor width is not sufficient to allow a bed trolley to turn into a room, a double door may be provided.

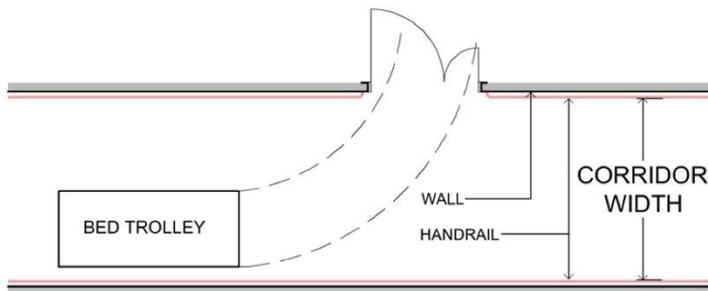


Figure 2.6: Corridor with double door room entry to permit turning

2.1.2 Staff Only Corridors

Staff only corridors with no patient traffic and where the corridor length is not greater than 12 metres, such as a corridor to a group of staff offices, may have a clear width of 1500mm. Consideration must also be given to accessibility requirements which may include localised corridor widening or provision of double doors to allow disabled staff to pass or to access doors.

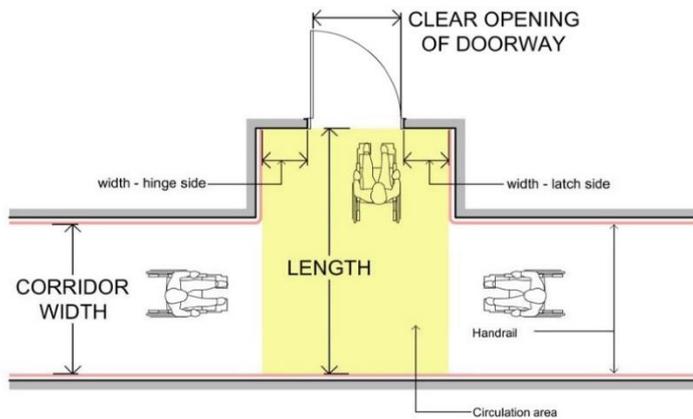


Figure 2.7: Corridor modified for people with determination access

In the figure shown above, the corridor has been modified to enable a person in a wheelchair the required circulation space to access and operate the door. The requirements of width - latch side, width - hinge side, clear opening of a doorway, the length, the direction of door swing and the direction of which a person approaches the doorway are inter-related and vary according to Dubai Universal Design Code.

2.1.3 Travel & Public Corridors

Travel corridors are inter-connecting departmental corridors that may be used by staff, patients and visitors.

The width of major inter-department arterial corridors and public corridors generally should be as wide as is deemed necessary for the proposed traffic flow, but should not be less than 2450mm.

2.2 Ceiling Heights

A ceiling height of 2700mm is recommended in work areas such as Patient treatment areas, Offices, Conference Rooms, Administrative areas and Kitchens.

The minimum acceptable ceiling height in occupied areas is recommended to be 2400mm, but consideration should be given to the size (sensory consideration) and use of the room.

Ceilings in patient bed areas including Bed Rooms, Bed Bays and Recovery areas should be a minimum of 2700mm. Bed Rooms for bariatric care may require an increase in ceiling height to accommodate lifting equipment. In critical care bed areas such as ICU, CCU, HDU and Resuscitation Rooms a ceiling height of 3000mm is recommended to provide sufficient height for ceiling mounted equipment and service pendants.

Seclusion rooms must be designed and constructed to avoid features that a patient could use for injury or self-harm. The recommended ceiling height is 3000mm with a minimum height of 2750mm.

The recommended ceiling height in new areas such as corridors, passages and recesses is 2700mm with a minimum of 2400mm. In existing facilities being renovated, ceiling heights in Corridors or Ensuites may



be reduced to 2250mm, but only over limited areas such as where a mechanical duct passes over a corridor. Wherever possible, reduced ceiling heights adjacent to doors should be avoided.

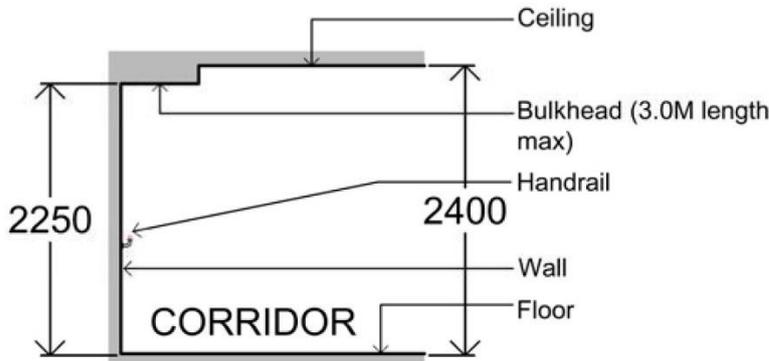


Figure 2.8: Corridor section showing minimum ceiling heights

In corridor bays or areas with restricted access such as a hand basins or a drinking fountain recess, a minimum ceiling height of 2250mm is acceptable.



Figure 2.9: Reduced height ceiling within a corridor bay

Rooms with ceiling mounted equipment, such as X-ray Rooms and Operating Rooms may require increased ceiling heights. Ceiling heights should achieve the minimum recommended height and comply with equipment manufacturers' installation requirements.

A minimum ceiling height of 3000mm is required in Operating rooms, Interventional Imaging rooms and Birthing rooms.

Ceiling mounted equipment must be able to achieve the required clearance height of 2150mm when in the stowed position, especially within circulation areas. Refer to Figure 1.10 below.

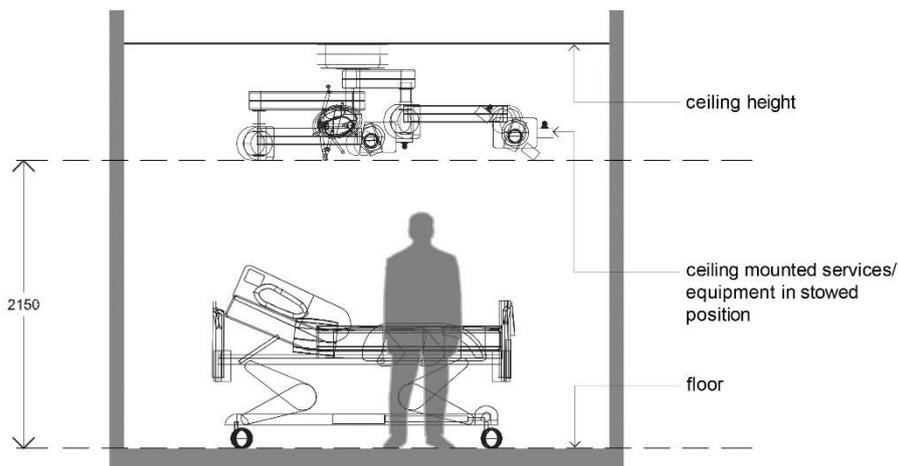


Figure 2.10: Ceiling mounted services stowed

Minimum ceiling (soffit) heights of external areas such as canopies over main entries, ambulance entries and loading docks should suit the requirements of the anticipated vehicle traffic. Special consideration should be given to emergency vehicles with aerials fitted. The recommended minimum ceiling (soffit) height is 3200mm.

Plant Room ceiling heights should suit the equipment installed and allow safe access for service and maintenance. The minimum recommended ceiling height is 2400mm in all trafficable areas.

Variations from recommended ceiling heights should be approved by the relevant health authority in writing.

2.3 Department Sizes

Department sizes will depend upon the perceived role of the facility as determined in the Service Plan and Operational Policies. Department sizes are also affected by the ability to share or combine functions as long as the planning provides for appropriate safety standards and optimal patient care.

For further discussion on departmental areas including Functional Areas, Gross Departmental Areas, Travel, Engineering and how to measure floor areas refer to Part B Health Facility Briefing and Design, in particular the section on Planning in these Guidelines.

Departmental sizes also are contingent on design efficiency. Refer to Efficiency Guidelines and Schedule of Circulation Percentages below.



2.4 Efficiency Guidelines

2.4.1 Schedule of Circulation Percentages

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

Department or Functional Planning Unit (FPU)	Minimum Circulation %
Administration Unit	20-25
Admissions Unit & Discharge	20
Catering Unit	25
Clinical Information Unit	15
Coronary Care Unit	35
Day Surgery/ Procedure Unit	40
Dental Unit	32
Education Unit	30
Emergency Unit	40
Engineering & Maintenance Unit	15
Health Centre	32
Housekeeping Unit	10
Inpatient Accommodation Units	35
Intensive Care Units	40
Laboratory Unit	25
Linen Handling Unit	10
Maternity Unit	35
Medical Imaging Units	35-40
Mental Health Units	35
Mortuary Unit	20
Nuclear Medicine & PET Unit	35
Operating Unit	40-45
Outpatient Units	32
Pharmacy Unit	25
Public & Staff Amenities Unit	10
Radiation Oncology Unit	40
Rehabilitation - Allied Health Unit	25
Renal Dialysis Unit	35



Sterile Supply Unit	25
Supply Unit	20
Waste Management Unit	20

Table 1: Recommended Circulation Percentages



3. Human Engineering

3.1 General

The discipline of human engineering is concerned with the design of machines, work systems and environments to consider the safety, comfort and productivity of humans, both able bodied persons and persons with determination. These Guidelines aim to provide designers with principles to guide their planning design in order to develop a space that is in line with these aims of human engineering. Designers must also comply with Dubai Universal Design Code applicable to people with determination, and Occupational Health and Safety (OHS).

A key consideration in hospital design is to provide an environment that promotes the independence of patients. Designers need to take into consideration:

- The needs of abled bodied persons including staff, visitors, patients.
- The needs of persons with determination including mobility impaired, visually impaired and hearing impaired persons. This includes people using short term mobility aids and staff with disabilities.
- Bariatric patients and visitors.
- Parents with children and prams.
- The needs of patients with mental illness or cognitive disorders.
- Minimise duplication and confusion between various Standards and Guidelines.

3.1.1 Planning

Initial planning should include provisions for people with special needs as noted above to avoid future building alterations that may be cost prohibitive.

3.1.2 Fixtures & Fittings

Fixtures and fittings that will be used for support including grab rails, handrails, shower rails, towel rails, soap holders and footrests should be able to support the weight of a heavy person including the concentrated load of a falling person.

Fittings and fixtures suitable for bariatric persons should accommodate weights of between 250kg and 500kg. Refer to Part B – Inpatient Unit – Bariatric for further information.

3.1.3 Handwashing Basins

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 paediatric, people with determination and standard.



Hand-washing facilities should be securely anchored to withstand an applied vertical load of not less than 115kg at any point on the basin. Additional provisions may be required for bariatric patients.

The basins provided for handwashing must be designed to avoid the risk of splashing to patient care areas. The water discharge point of the handwashing basin faucets should be a minimum of 255mm above the bottom of the basin and provided with regulated water pressure. Handwashing basin used by medical and nursing staff, patients, the public, and food handlers should have fittings that can be operated without using hands.

3.1.4 Staircases and Ramps

Where ramps are required for patient access, minimum gradients are to comply with the requirements of the Dubai Universal Design Code. Ramps should be designed to suit their intended purpose and provide for the correct width and slope, particularly if used for mobile equipment such as beds, manual trolleys, motorised trolleys, pallet movers or vehicles.

Special consideration should be given to the surface covering of ramps to provide a non-slip finish and reduce the force required to move mobile equipment.

Design of staircases are to comply with the Dubai Universal Design Code. Consideration should be given to:

- Security to prevent objects being thrown or falling down the staircase
- Use of non-slip treads
- Provision of adequate lighting

Recommended gradient to ramps is 1:20.

As per the Dubai Universal Design Code, the maximum gradient to ramps is 1:12, the compliance of which should be ensured.



4. Ergonomics

4.1 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.

The design of common elements such as workstations and typical rooms will have a significant impact on the occupational health, safety and welfare of staff and patients. Many jurisdictions now place a legally enforceable duty of care on designers and manufacturers to ensure a safe work environment.

Ergonomics incorporates aspects of functional design - the practise of designing elements to take into account the proper use and to suit the people using them. There is a vast body of expert opinion available on ergonomic standards and while there are differences on some ergonomic aspects such as sitting posture or monitor angles there is also agreement on a majority of issues.

Ergonomic standards provide a baseline for design that will suit a majority of situations and people. It is not possible to arrive at a solution that is applicable to all due to individual differences. Ergonomic principles endorse the use of adjustable spaces and objects to allow for the special needs of staff, patients and visitors as far as possible.

Designers typically design for their target populations based upon percentages of the population described as percentiles. It is common to design for all falling between the 5th percentile of females to the 95th percentile of males. The 5th to the 95th Percentile range accommodates 90% of the target population as represented in the diagram below.

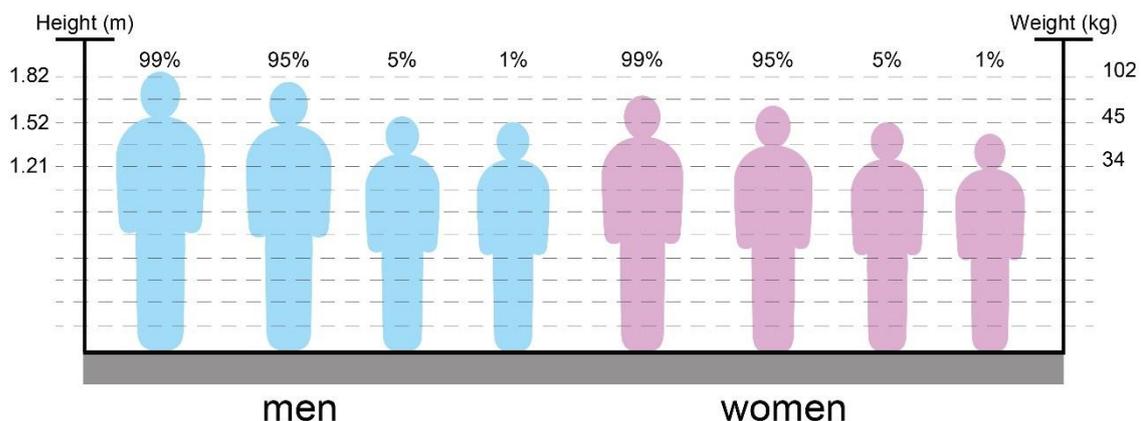


Figure 4.1: The relative sizes of different percentile adult humans (from All Steel Ergonomics and Design, A Reference Guide)

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 Healthcare Facilities.



For additional information and relevant standards, please refer to the ‘Further Reading’ list at the end of these Guidelines.

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 OH&S officers.

4.2 Accessibility Standards

Readers should refer to Dubai Universal Design Code and Barrier Free design that cover the subject of access for people with disabilities. Special consideration is given to the following:

- Access ways and circulation
- Corridors and pathways suitable for wheelchair users
- Facilities for people with ambulatory or sensory disabilities

Parts of the facility may be specialised 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, 'specialisation' 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 suitably sized and designed for use by people with disabilities are provided. This is separate to the expected number of patients with disabilities or patients in a wheelchair as a result of their illness. These are identified in the relevant sections of the FPU's in **Part B** of these Guidelines. These ergonomic guidelines cover the average use of facilities by able bodied persons.

4.3 Ergonomic Standards

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

Item	Condition of Use	Depth mm	Height mm	Thickness mm	Mandatory	Remarks
Work bench	Utility	600	900	Max 35	No	Flat Monitor
Writing bench	Keyboard use	750	680-720	Max 35	No	Flat Monitor
Writing bench – height adjustable	Keyboard use	750	610-760	Max 35	No	Seated user
Writing bench – height adjustable	Keyboard use	750	660-1180	Max 35	No	Seated/ standing user



High Counter (parcel shelf)	Over bench	250	1150	20-35	No	600mm reach to the inside edge of counter
Shelving	Over 900mm high bench	350	1520-1810	20-25*	No	2 shelves
Shelving	Over 720mm high bench	350	1370-1710	20-25*	No	2 shelves
Shelving Unit	Full Height	350-400	1500-1810	20-25*	No	7 shelves adjustable

Table 2: Recommended ergonomic dimensions in work areas

Note: * shelf thickness is subject to span, intended load and method of support

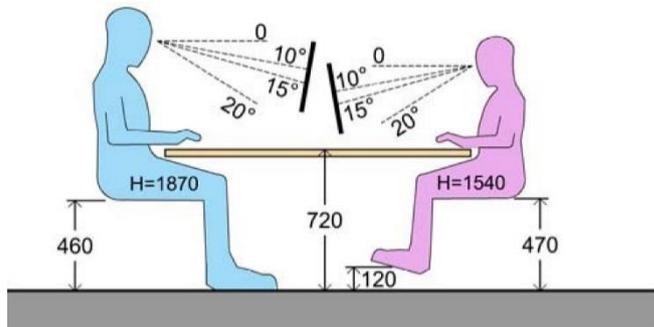


Figure 4.2: People of different heights sitting at a fixed height workstation

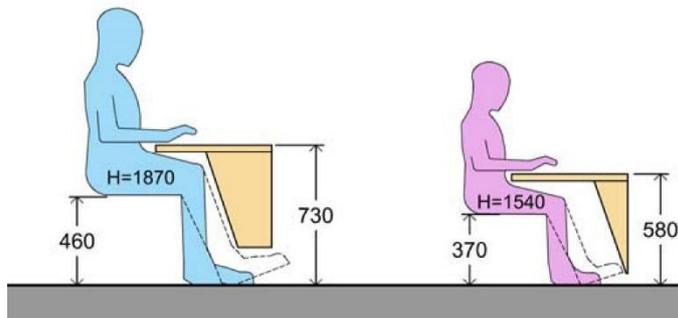


Figure 4.3: People of different heights sitting at an adjustable height workstation

Refer to Section 3.5.2 below for recommended clearance zone behind chairs.

4.4 Reception/ Staff Stations

4.4.1 General

The functions undertaken at the Reception or Staff Station may include:

- Reception of visitors and enquiries



- Staff work base and control station
- Reporting and recording in patient records
- Dispensing to patients and relatives

The Reception/ Staff station will generally consist of a workbench or workstation and may include a countertop. Refer to Ergonomic Standards in section 4.3 for standards applicable to workbenches.

4.4.2 High Counter

The Reception/ Staff Station may include a high counter (also known as a parcel shelf or service counter) to conceal objects, records and equipment from view and may also be used as a writing surface and for signing documents.

Design of high counters should address the following:

- If the counter is used for communication and contact between staff and visitors, care should be taken to avoid excessive reach across the workstation area and to avoid excessive height which can be a barrier to communication.
- If a flat panel display is required, the workstation surface width should be 750mm deep
- If the countertop is used as a writing surface and to transfer items and documents, the workstation depth should be reduced to provide a 600mm maximum reach to the countertop for the relevant section.
- The recommended height of the top counter used against a work surface height of up to 720mm above the floor is 1130mm above floor level. 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 height of 900mm to 1000mm is between 1200mm and 1250mm above the floor level. The use of a sitting/ standing height adjustable table is not recommended for this application.

4.4.3 High-Low Design

Where children or visitors using wheelchairs are expected at the Reception or Staff Station counters, a design incorporating a high section (for staff privacy) as well as a low section is recommended.



The low section is typically at 830 to 870mm above the floor to allow users in wheel chairs to approach the counter front on. Adequate leg room beneath the work surface is required.



Figure 4.4: Examples of Staff Stations design integrating both high and low counters

4.4.4 Security Barriers

In some situations, it may be necessary to provide a security barrier at the counter. This may be of a high quality plastic or in a variety of security glass including laminated glass, toughened glass, laminated and toughened glass and glass with a special security film.

In such situations, the barrier will include a slot that is sufficient to allow the passage of sound and small objects. A slot of 125 mm is recommended. If a glazed security barrier is provided at a counter used for public interaction, then an intercom system may be considered to amplify the sound for persons with hearing impairment.



Figure 4.5: Staff Station with security glazing barrier

At counters 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.

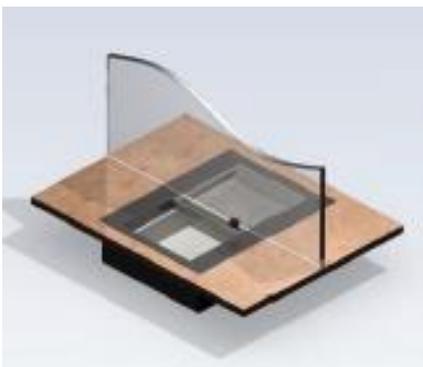


Figure 4.6: Counter with security barrier and pass through drawer

If the Reception/ 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 grille or similar device should be operable by the staff from the normal standing height.



Figure 4.7: Reception with vertical roller shutter for after-hours security



4.5 Workbenches

4.5.1 General

Workbenches may be designed for sitting or standing positions depending on the preference and work practises of the staff using them. Both options are suitable for their intended purpose; however the ergonomic standards for the two will vary as identified below.

4.5.2 Sitting Position Workbench

The height of a workbench used in the sitting position should be between 680mm to 720mm above the floor. The typical minimum depth is 600mm. Consideration should be given to clearance behind the rear of a chair especially when a fixed object or another workstation is placed back to back. The recommended clear distance is 1200mm.

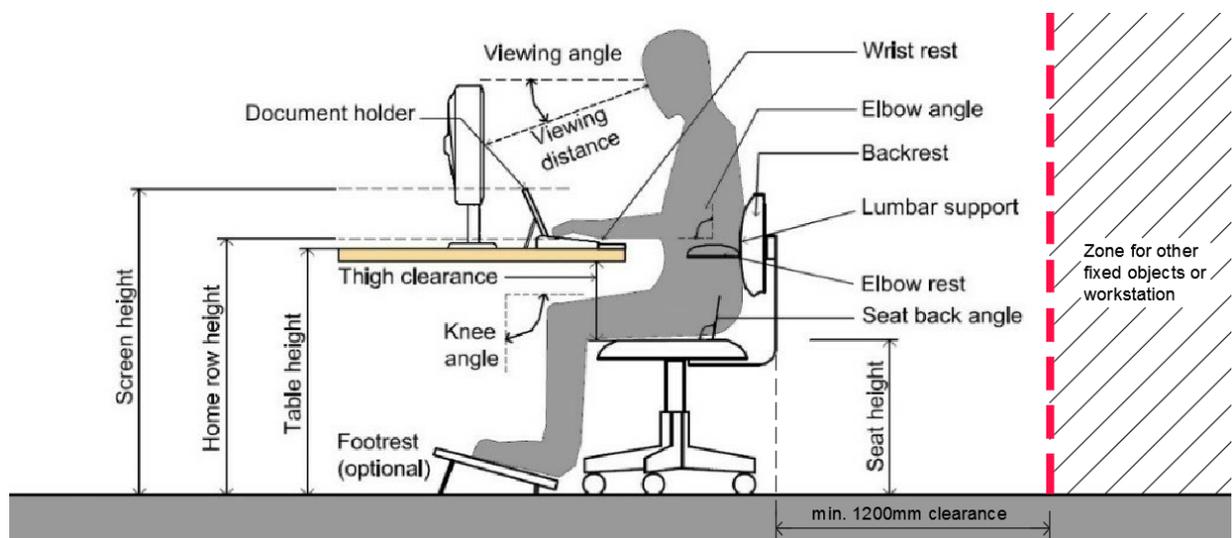


Figure 4.8: Ergonomic elements of the workbench used in the sitting position

4.5.3 Standing Position Workbench

The standing height workbench may also be used for seated activities. In this circumstance, ideally the work bench would be height adjustable.

The height of a workbench used primarily in the standing position, even with keyboard work should be 1000mm above the floor. Examples include Staff Stations, Reporting stations, Pharmacy Counters.

If the workbench is used for a majority of work in the standing position but seated for keyboard work then the recommended height is 900mm above the floor. This option is most frequently used in Utility Rooms, Laboratory benches and Kitchens. If seated activities are required at a standing position workbench, a high stool with a footrest should be provided.

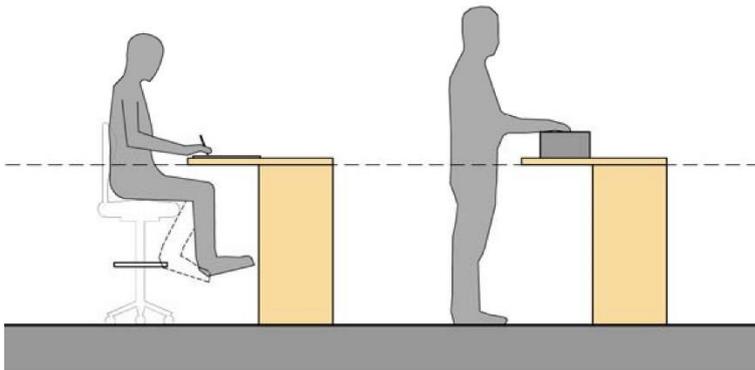


Figure 4.9: Standing height workbenches with seated position and standing positions

4.5.4 Foot Support

Shorter staff may use foot rests in the sitting position to lift the feet to the optimum ergonomic position. Chairs used at work benches used in the standing position should have foot support rings and be height adjustable. Standing height work benches 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.

Refer to Figure 3.10 for appropriate foot support while seated at a standing height workbench.

4.5.5 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 becoming a danger to users. The support may be gained by using sufficiently thick and sturdy materials such as 32mm fibre board or thinner materials such as 25 mm fibre 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 35mm. Supports should be designed to avoid contact with the user's knees.

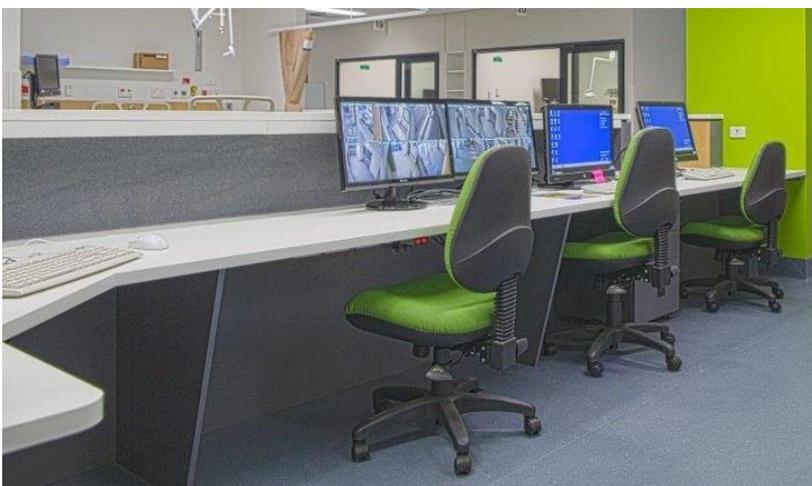


Figure 4.10: Workbench top of 32mm thickness with bench supports



4.6 Workstations

4.6.1 General

Workstations include proprietary corner workstations, workstations without a side bench and desks which may include a side return.

A workstation intended for working, writing or keyboard use while in seated position should be within the range of 680mm and 720mm high, ideally 700mm. Wherever possible, to allow for personal height differences, workstation desks for seated users should be height adjustable within a range of 610mm and 760mm.

If the workstation includes a side return, the depth of the return may be between 450mm and 750mm with 600mm being the optimum recommendation. This will allow for under-bench storage such as pedestal units, filing or drawer units.

Workstations designed with an angled corner to accommodate a computer should provide a minimum dimension of 400mm across the corner to allow for a keyboard.

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.

Workstations should include a modesty panel if they face onto an open area or if visitors are expected to sit across the workstation.



Figure 4.11: Typical corner workstation with privacy screen/ pinboard/ modesty panel

Workstations should have provision for safe cable management. With the advances in workstation design and height adjustable desks, many alternatives for cable management are available however the



better systems all have the commonality of easy access to outlets, both power and data. It should not be possible to accidentally knock out cables or spill liquids into power outlets.

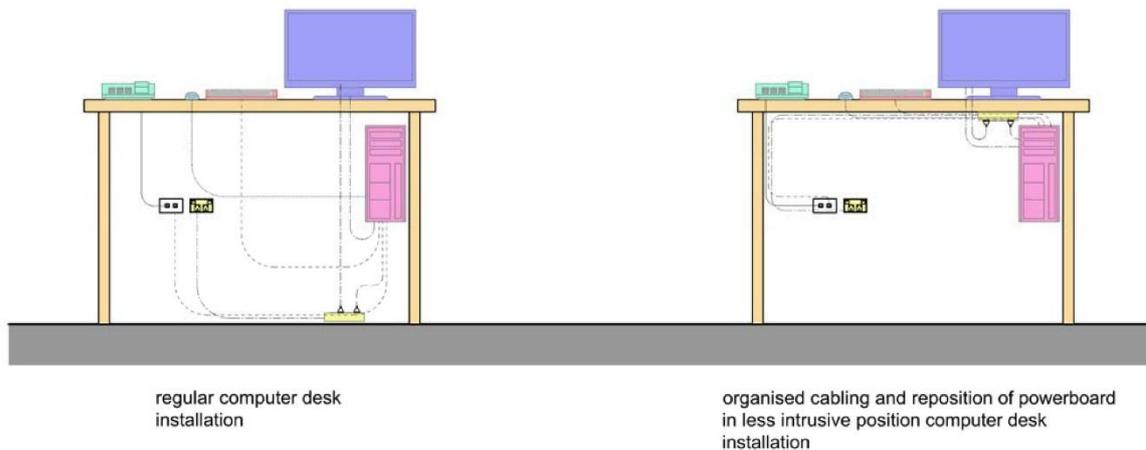


Figure 4.12: Cable management system before installation and after installation

4.6.2 Hot-desks / Mobility Centre

In the modern work environment staff tend to be highly mobile; hot-desking is a system of organisation allowing multiple staff to use a single shared work point at different time periods.

Hot-desks can take many forms, from a full shared workstation to multiple smaller desks which may be occupied for limited periods of time. Collections of such hot-desks may be referred to as Mobility Centres.

Hot desk stations should have easily accessible, typically above desk, power and data connection points. Desks should be height adjustable to accommodate different personal dimensions and should be 750mm to 800mm deep to accommodate a laptop computer, a flat screen monitor and separate keyboard.

Where it is anticipated that Hot-Desk users would be using laptop computers it is recommended that the work point be established with monitors and keyboards ready for connection to the laptop to provide users with an ergonomically safer environment.

4.6.3 Sit–Stand Workstations

Research has suggested that sitting for extended periods of time may have some health risks; accordingly it is becoming more common for staff to want work stations that accommodate both sitting and standing working options.

A sit–stand workstation should be electronically height adjustable between the heights of 660mm to 1180mm. Suitable arrangements for the provision of power and data connections must be made, typically either wall below the lowest desk height or preferably soft wired desk mounted outlets to remove the risks associated with trailing power and data cables as the desk is raised or lowered.

Sit–stand work points are not suitable in all locations and it is recommended that work points for public interface should be either sit or stand to suit the application required.



4.7 Computers

4.7.1 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.

4.7.2 Computer Monitors

The type of monitor will dictate the depth of the work surface. Older type CRT (Cathode Ray Tube) monitors which require greater workstation depth to permit a comfortable distance from the user's eyes are rarely used now. Flat screen monitors require less depth of surface and are easier to look at for longer periods as they are low glare and almost eliminate screen flicker. The lighter weight and support stand design of flat panel screens also provide greater flexibility to adjust monitor height to improve user posture.

4.7.3 Monitor Position

Ideally, the monitor position should be adjustable both vertically and horizontally to suit different users. The height of the User will influence the vertical position of the monitor. The best option is for an adjustable monitor arm. These are, however expensive and are not recommended for all conditions as most flat panel monitors come with some height adjustability built into the monitor stand. For most users, a fixed monitor is acceptable.

The angle of view to the centre 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. The recommended head tilt sustained over a long period is 15 degrees; excessive head tilt may result in fatigue. The most comfortable viewing zone is between 32 degrees and 45 degrees below the horizontal as represented in the diagram below.

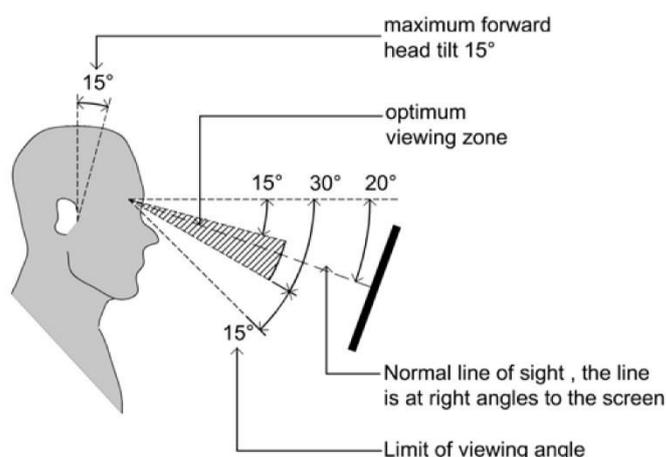


Figure 4.13: Recommended viewing angle (Source: AS 3590.2-1990 Screen based workstations Part 2 Workstation furniture)



The optimum areas for the location of key objects on the workstation or desk are demonstrated in the diagram below.

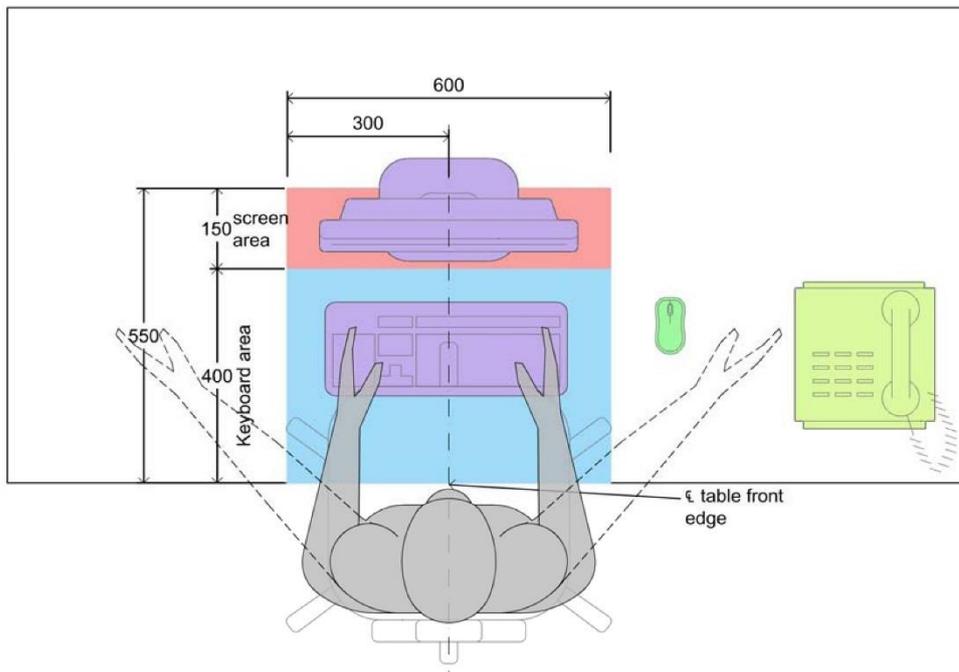


Figure 4.14: Optimum location of key elements on a workstation (Source: AS 3590.2-1990 Screen based workstations Part 2 Workstation furniture)

4.7.4 Laptops

The modern laptop is a powerful and portable device which is frequently used in place of desktop computers, particularly for mobile staff and staff using hot-desks. Laptops are designed for portability and that inherently creates a conflict with good ergonomic positioning of both screen and keyboard.

Where Laptop computers are used for periods of time in excess of one hour the laptop should be supplemented with a stand to allow its screen to be placed in an ergonomically correct position and a supplementary keyboard. Alternately a separate monitor, set up in an ergonomically correct position that can be connected to the laptop and supplementary keyboard is recommended.

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 and user flexibility.

4.8 Shelving

4.8.1 General

The design of shelving should address issues of depth, height, spacing and strength. Shelving covered by these guidelines include shelving units (proprietary or joinery), strip shelving, bookcases, metal shelving units and racking and shelves within cupboards.



4.8.2 Depth

Shelving depth recommendations are as follows:

- Shelves below a bench should be the same depth as the bench
- Shelves that are wall mounted including shelves over a bench or workstation should be 350mm deep; if cupboard doors are required the total depth should remain 350mm
- Shelves for medical records should be 400mm deep to allow for files to be stored laterally

4.8.3 Height and Spacing

For all types of wall shelving, height and spacing recommendations to optimise reach for persons are as follows:

- The lowest shelf should be not less than 150mm above the floor
- The highest shelf should be up to 1810mm above the floor; any shelf higher than this will require a step ladder to access
- Shelving above a 720mm high work surface should start at 1350mm to the underside; the underside of the shelf will be 630mm above the work surface
- Shelving above a 900mm to 1000mm high work surface should start at 1500mm to the underside; the underside of the shelf will be 500mm to 600mm above the work surface
- Shelving for medical records should be 2200mm high with 7 shelves starting at 150mm above the floor up to a maximum height of 1800mm
- Shelving used for linen storage should be 450mm deep and a minimum of 400mm apart; for linen shelves located above a linen supply trolley the depth of the shelf should match the depth of the trolley

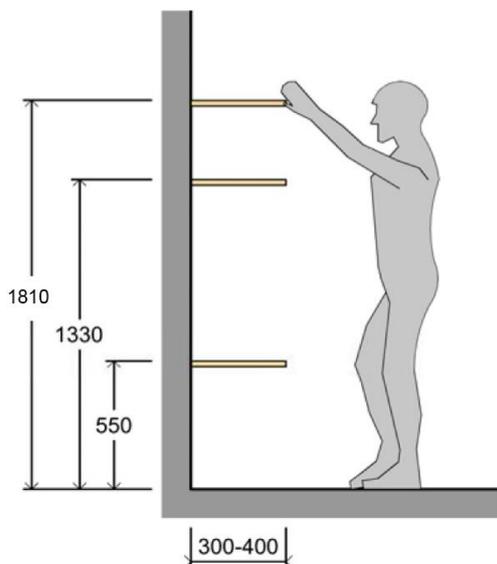


Figure 4.15: Reach of standing person to shelving



Figure 4.16 Shelving installed over desk



It is recommended that all shelving be adjustable as far as possible. Joinery units may include fixed shelves when items to be stored require additional support.

Note: In heavy use areas of hospitals, the conventional metal pins inserted into joinery walls often fail. In such situations, proprietary metal strips to hold shelf supports may be preferred.

Designers should refer to DHA infection control policies and **Part D - Infection Control** of these guidelines for suitability of proprietary shelving systems for clinical areas.

4.8.4 Strength

Design of shelving should suit the weight of items to be stored. Heavy items may require fixed shelving, additional shelving thickness, shorter shelving spans or use of stronger material such as metal. Adjustable shelving does not have the strength of fixed shelving and is more suitable for light weight objects.

4.8.5 Access for people with determination

Shelves designed for use by people with determination including patients, visitors or staff should comply with relevant accessibility standards.

Recommended reach heights to shelving and across a bench for persons in a wheelchair are demonstrated below.

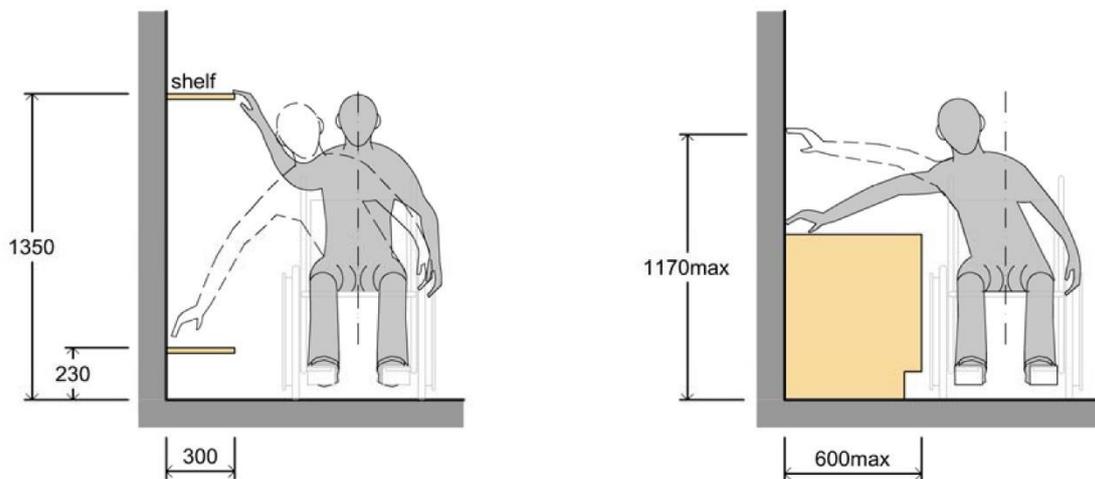


Figure 4.17: High and low side reach of a person in a wheelchair to shelving and to a bench



5. Signage

Signage and wayfinding are important in a hospital precinct to direct patients staff and visitors to areas and to prevent access to restricted areas. Signage and wayfinding systems should comply with Dubai Universal Design Code and DHA Guidelines where they are provided and applicable.

The following guidelines are provided to cover common elements within the healthcare setting.

5.1 General

The font style chosen for signs should be a simple open style and easy to read. The preferred English lettering style is 'Dubai' or 'Arial' as an alternative, upper and lower case generally. Upper case only is recommended for the building Main Entry Sign. This is not mandatory.

Equivalent translation in Arabic to be placed above English.



Figure 5.1: Example of font style in Arabic and English

The size of lettering is related to the height of the sign and the reading distances and should comply with Dubai Universal Design Code and relevant DHA standards.

There should be a luminance contrast of 30% minimum between the lettering and the background of all signs.

Internationally recognised symbols (pictograms) in lieu of room titles are recommended as these are universally understood.

Braille and Tactile signage are recommended for all signs within reach range.



Figure 5.2: Internationally recognised pictograms



Figure 5.3: Door sign with braille



It is recommended that the facility have an exterior or interior sign indicating the type and level of care and the hours of operations, particularly if the facility is not open 24 hours per day, seven days per week. For example, Day Surgery Centre, Opening Hours 8am to 6pm, Sunday to Thursday.

If a Hospital does not provide Emergency care, it is recommended to have an external sign indicating the address of the nearest 24 hours Emergency facility for redirection of urgent cases arriving after hours at the wrong facility.

5.2 External Signs

5.2.1 External Directional Signs

Entry points to the facility should be clearly identified from all major transport/ circulation modes (e.g., roadways, bus stops, vehicular parking). The exterior signage should be clearly visible from a distance and understandable with icons, universal symbols and/or cues for orientation.

Boundaries between public and private areas should be well marked or implied and clearly distinguished. Signage should be flexible, expandable, adaptable and easy to maintain. Signage should be consistent with other patient communications and supporting print, web, and electronic media.

It is recommended that external directional signs have large letters on a contrasting background colour. External signs should be constructed of steel or aluminium if possible and be weatherproof.



Figure 5.4: Example of external building signs

5.2.2 External Illuminated Signs

It is recommended that external illuminated signs such as those used for the Building, Main Entry, Night Entry or an Emergency Unit should have white letters on a contrasting background; signs for Emergency are commonly white lettering on a red background.



The Emergency Unit (as referred to in part B of these Guidelines) should have only “Emergency” and “وحدة الطوارئ” on the external sign for simplicity. The sign may include a symbol as required and should be clearly visible from the entry to the site.

5.2.3 Road Markings

Road markings such as parking bays, arrows, symbols and instructions should be white generally, blue for dedicated accessible zones and yellow for restricted zones, but must comply to Dubai Municipality and/or RTA regulations.

5.2.4 Street Signs

Street signs shall be in accordance with the requirements of the Dubai Universal Design Code, Municipality and/or the appropriate section of the regional roads and traffic authority.

It is recommended and usually required by accreditation standards, that the facility has adequate street directional signs that allow the site to be easily located from the major approaches in the area, including by road, rail or by foot.



5.3 Internal Signs

5.3.1 Directional Signage

Directional signs are normally ceiling or wall mounted and not illuminated. It is recommended that directional signs apply the following principles:

- Directional signs be provided to direct patients, staff and visitors from the entry to all major destinations, including the room required
- Exit directions be included where necessary
- Text be dark lettering on a light background or vice-versa for clarity and ease of reading
- Directional signs on ceilings should not obscure any other ceiling services, light fittings, emergency lighting or fire exit signs

Directional signs in the Main Entry area, Foyers, Lift Lobbies and public amenities areas may include braille lettering for the visually impaired. If provided, it is recommended that signs with braille should be located immediately above the hand rail.



Figure 5.5: Corridor directional sign, ceiling mounted



Figure 5.6: Directory sign beside lift entry

Signage is recommended for destinations for patients and visitors. Signage for staff-only rooms are optional.

5.3.2 Room/ Door Signs

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

- If the room function is likely to change, the sign system used should allow easy replacement; for removable signs, consideration needs to be given to the following:
 - Vinyl-cut lettering is a practical and inexpensive option, capable of easy changing, however removal may cause damage to some surfaces
 - Some signs using removable slats can be easily stolen unless a locking cap is used



- Not all rooms will require a sign, signs may not be provided to staff only rooms
- Signs may be provided to indicate rooms with restricted access, e.g. Staff Only
- Room signage should comply with the facility standards

Room/ Door signs in general are not mandatory.



Figure 5.7: Viny-cut lettering sign



Figure 5.8: Removable slat type signs, with a locking cap

5.3.3 Bed Numbers

Bed numbers assist staff and visitors to find patients or bed locations as necessary. Each bed should be provided with a separate number. Bed numbers should be located outside the patient bed room, clearly visible in the corridor and not obscured by equipment parked beside rooms.

For multi-bed rooms, a range of numbers may be shown outside the bedroom.



Figure 4.9: Room signs for bed numbers

Multi-bed rooms and open bed bays should also display the bed number in each bed space, which is visible with the privacy screen curtains closed.



Figure 5.10: Room/ Door Signs and bed number signs outside the entry to the bed space



5.3.4 Patient Information

Signage requirements in patient areas and Bed rooms need to carefully consider patient confidentiality issued.

For patient privacy and confidentiality of patient records it is not recommended to display patient information on signs within the patient bed rooms such as patient details, doctor or special instructions.

Patient information should not be visible to the public at Staff Stations/ Nurse Stations and Receptions. Handling of Patient Information must comply to the Law.

5.3.5 Door Number Signs

In some facilities a room/ door number sign will be required on the door frame for maintenance purposes. Where provided these signs should be unobtrusive. If room/ door numbering is required to a whole facility it is recommended that numbering is consistent throughout and sequential. Door numbering is mandatory.

5.4 Miscellaneous Signs

The healthcare precinct will include various other signs that may be illuminated or non-illuminated such as:

- Illuminated 'X-ray Room in Use' or 'Laser in Use' signs
- Radiation warning signs and symbols
- Security surveillance warnings
- Safety warning signs

The colours and wording used should meet the requirements of the relevant code or regulating authority.

5.4.1 Fire Services & Egress Signs

Fire services and egress/ exit signs will be installed in accordance with the UAE Fire and Life Safety Code, Dubai Universal Design Code. As fire service equipment signs are required to be identified from any direction, consideration should be given to use of cantilevered wall signs in these location



6. Doors

6.1 Door Swing

Doors subject to constant patient or staff usage should not swing into corridors in a manner that might obstruct traffic flow or reduce the required corridor width. Where doors need to swing out into corridor they should be set in a recess. The recess should extend a minimum of 100mm beyond the extend of the door swing.

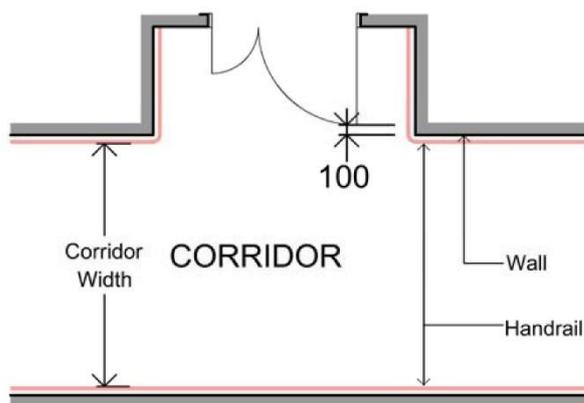


Figure 6.1: Doors swinging into a corridor should be recessed

6.1.1 Doors for Fire Egress

All doors used for fire egress should comply with the requirements of UAE Fire and Life Safety Code and Dubai Design Universal Code. If such doors also form part of a fire or smoke compartment, they should 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.

6.1.2 Doors in Patient accessed areas

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 into rooms from corridors and circulation areas. The exceptions may include:

- Doors to small patient Ensuites, Toilets and Showers should generally open out
- Doors to accessible Toilets and Showers should open out
- Doors to small Change Cubicles should open out
- Doors subject to the requirements of "Emergency Access" should open out or open in both directions



- Doors to mental health patient rooms should open outward or have a break-out type door
- Doors to isolation rooms should depend on the type of pressurisation (refer to **Part D - Infection Control** of these guidelines)

6.2 Door Openings

Clear door opening widths between two sections of a corridor or from one corridor to another should 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.

The recommended minimum clear door opening width to Patient Bedrooms in new areas is 1400mm wide and 2140mm high. This is to ensure sufficient clearance for the movement of beds. In existing areas being renovated and, doors with reduced dimensions may be approved in situations where it is not possible or economical to replace the doors, as long as the function is not adversely affected. In any case, doors to patient bed rooms should not be less than 1200mm wide and 2040mm high.

In existing facilities where clear door width is not being achieved, designers may consider the use of Parliament type hinges to achieve great clearance.

Rooms that require access for stretchers, wheelchairs, people with determination or using mobility aids should have a minimum clear door opening of 900mm. Where access is required for hoists and shower trolleys such as Ensuites, Bathrooms, Patient Showers, a minimum clear opening of 1000mm is recommended.

Door openings must take into consideration requirements for special equipment that may be moved into patient accessed rooms, such as bariatric equipment and lifting apparatus.

6.3 Emergency Access

Certain rooms that are used by patients should 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 less than 6m²
- Rooms where there is less than 2.5 metres 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 should 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, whilst managing security in normal use.

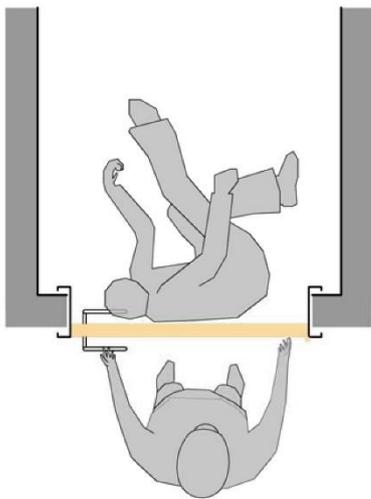


These Guidelines recommend the use of retractable door stops (strikes) within flat metal door frames together with coin operated door snibs. The snib can be opened with a coin while the door can be opened outward by simply pushing the door stop into the frame. Refer to figure 5.2 below.

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

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

door access blocked



door access unblocked

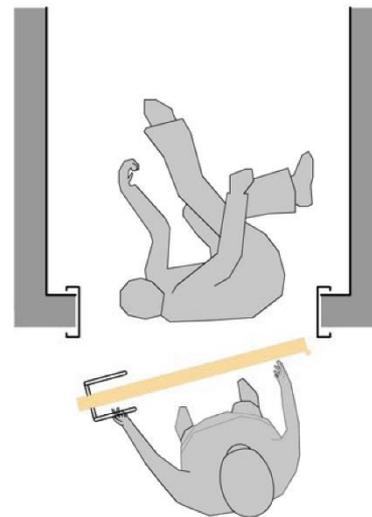


Figure 6.2: Inward opening door access blocked

Figure 6.3: Outward opening door access unblocked

In all areas except mental health secure rooms, surface sliding doors installed on the outside of the room may satisfy the requirements of this section. 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

6.3.1 Mental Health Seclusion Rooms

In mental health seclusion rooms, the following configuration is recommended:

- Two standard doors, opening outwards; doors should be separated
- Alternatively, one standard door opening inward and one adjacent door minimum 450mm wide, opening out
- Both doors with external locks and fully recessed internal handles or special mental health standard anti-ligature door handles

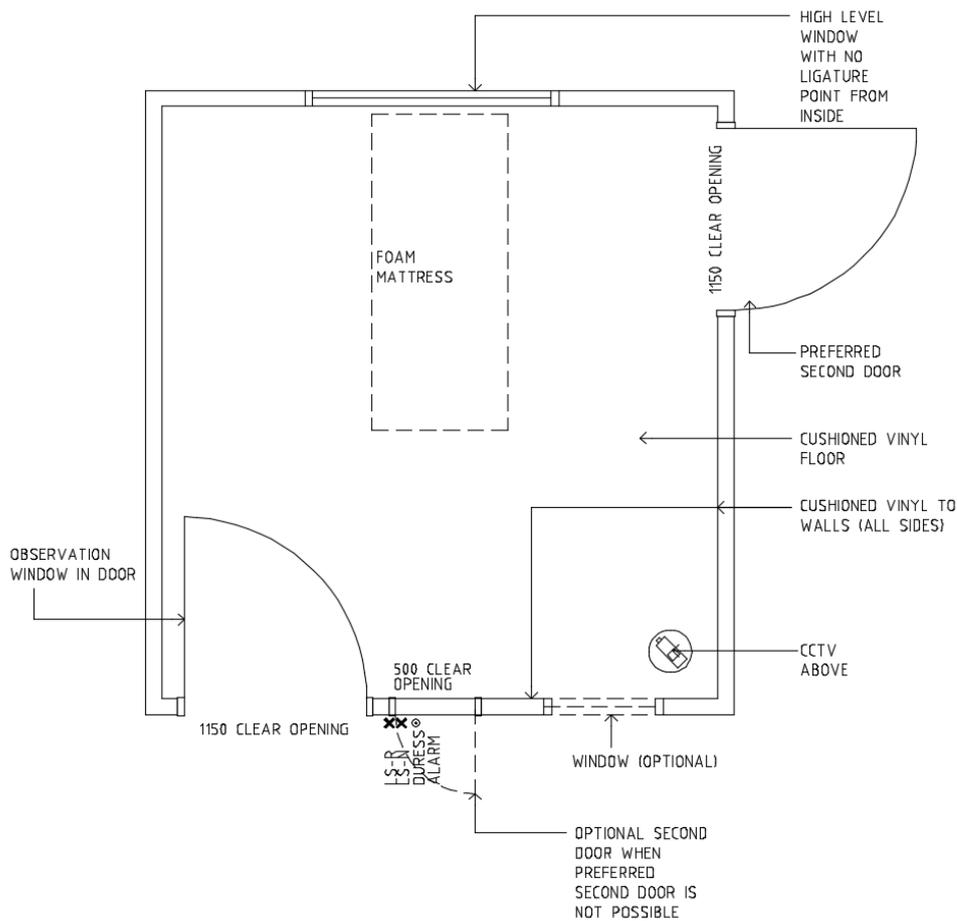


Figure 6.4: Recommended door openings for Seclusion Room

For additional information on doors in Mental Health Units refer to relevant **FPU**s in **Part B** of these Guidelines, i.e. **Mental Health Unit - Adult, Mental Health Unit - Child & Adolescent and Mental Health Unit - Older Persons**.

6.4 Door Hardware

6.4.1 Handles

In all doors within a health campus, consideration should be given to the shape of the door handle so that it is not caught by pockets in clothing of staff, patients or visitors. Handles with a full return (free end of the handle bending towards the door surface) are recommended.



Figure 6.5: Recommended door handles with a full return



Figure 6.6: Recommended anti-ligature door knob and short lever door handle for mental health facilities

The door handle/ hardware should allow the door to be unlocked and opened with one hand. The handle should be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch.

6.4.2 Push / Pull Plates

For doors where a door lock or latch is not required, a push plate with pull handle may be installed. Examples include Dirty Utility or scrub rooms where staff may be carrying objects or have wet hands

In Paediatric Units, doors that require a push/ pull plate only may have a second push/pull plate installed at paediatric height, if used by paediatric patients.



Figure 6.7: Push Plate and Pull handle



Figure 6.8: Door hardware suitable for acute mental health Units

6.4.3 Locks

Door locking may include keyed locks, electronic locking systems, snibs, push buttons and privacy latches with indicators. Door locking should be suitable to the function of the room and the security requirements of the Users. Door locking should always allow escape from inside a room accidentally locked. Fire exit doors should be openable from the inside with a single action. It is recommended that door hardware and locking be flexible as far as possible to allow for future change of use.

In addition to the above, provision of locks and secure doors must also comply with the UAE Fire and Life Safety Code with special consideration to Mental Health Facilities.

Certain rooms in a healthcare facility should not be lockable by the patient and these include:

- Standard Inpatient bedrooms (not Mental Health*)
- ICU/ HDU/ CCU/ NICU/ PICU patient rooms
- Isolation rooms (except bed access doors from the corridor when dual access to the patient room is provided)

* In Mental Health, patient can lock the door but staff must be able to open from outside of the room. Staff will have key and the latch must be retractable.

6.4.4 Hold Open Devices

Doors that need to remain open may require hold open devices, to prevent them closing, particularly in main travel and circulation pathways. Hold open devices should be installed according to relevant fire regulations, building codes and standards. Designers should consider the following if hold open devices are required:

- The devices should be activated in easy reach without bending down.
- Hold open devices should not be installed on doors that are required to stay closed such as pressurized rooms.
- Devices should not be installed on doors where disturbed patients may lock themselves in a room



- Hold open devices should not be installed in Mental Health Unit patient areas where they may create a ligature point and be used for self-harm.
- Electronic hold open devices linked to a fire/ smoke alarm system are acceptable and must have a manual release button as part of the device; Doors fitted with electronic hold open devices must also be fitted with self-closers and if double doors, a door selector device. Any Fire Door fitted with an electronic hold open device must be provided with a clear warning sign “Automatic Fire Door – Keep Clear”.

In travel pathways used frequently by staff pushing trolleys or carrying items through doors that need to remain closed it is recommended that delayed action self-closing devices are installed.



Figure 6.9: Electronic operated door hold-open device
(floor or wall mounted)



Figure 6.10: Delayed action door closers

6.4.5 Self-Closing Devices

Self-closing devices are fitted to doors that are required to stay closed that may include:

- Pressurised rooms such as Isolation rooms
- Entry doors to Units that have restricted access such as:
 - Operating Unit
 - Paediatric Unit/s
 - Sterile Supply Unit
 - Catering Unit
 - Mental Health Unit/s
- Air locks, with or without air pressurization
- Birthing Rooms
- Clean and Dirty Utility Rooms
- Disposal Rooms

Self-closing devices are discouraged to the following rooms:

- Offices



- Patient Bedrooms
- Bathrooms, Ensuites, Toilets, Showers
- Rooms used independently by people with disabilities
- Meeting Rooms and Interview Rooms

If self-closing devices are fitted to Patient Bedroom doors, they should be mounted on the public side of the door rather than the patient side.

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

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

Self-closing devices required to fire and smoke doors should be installed according to UAE Fire and Life Safety Code and Dubai Universal Design Code.

6.5 Metal Doors

These guidelines neither require or recommend the usage of metal door leaves. Metal doors may hold static electrical charge and need to be grounded in all Cardiac Protected Areas if used. Metal door leaves may be used in plant rooms, electrical rooms, waste management rooms and similar services areas. However, metal door frames are acceptable and recommended for its durability and sturdiness.

6.6 Door Grilles and Undercuts

Door grilles or undercuts may be required to facilitate air-conditioning systems, to allow for return air or for balancing of air pressurisation between rooms. Door grilles or undercuts should be used where mandated pressure differentials are required to adjacent spaces in accordance with Part E of these guidelines.

Door grilles or undercuts are not recommended in the following rooms or areas:

- Pressurised isolation rooms, negative or positive
- Rooms with radiation shielding
- Rooms requiring acoustic privacy
- Fire or smoke doors

Door grilles are not recommended in the following areas:

- Doors used by people in wheelchairs, due to potential damage
- Doors in patient areas within a mental health unit, to avoid potential for self-harm



- Doors in Ensuites, Bathrooms, Toilets or Showers

An alternative to door grilles may be the use of a door undercut. Care needs to be taken however to avoid the use of large undercuts close to shower areas which result in water leakage into adjacent rooms. An Inward sloping door slot may be considered instead of an undercut. A door slot should be located a minimum of 200mm above the floor to prevent water leaking into adjacent rooms.



Figure 6.11: Door with grille



Figure 6.12: Door with undercut



Figure 6.13: Door with slot

6.7 Observation Glass

Glazed panels may be provided in doors where visual observation for reasons of safety, security or patient observation is required. Obscured or frosted glazing of varying degrees may be provided to doors where it is necessary to observe a person standing behind the door while maintaining room security and privacy.

Observation panels in fire doors must comply with the relevant Building Codes and Standards.

Observation glass is recommended to the following doors:

- Operating and Procedure Rooms
- Scrub Rooms
- Air-locks
- Clean and Dirty Utilities; partially frosted glazing may be applicable in these rooms where a level of privacy and security is required
- Interview rooms including those used in mental health units
- Rooms requiring an observation window but with no physical possibility of providing a window
- Kitchens and Pantries
- Corridor access doors



Observation glass is not recommended to the following doors:

- Patient Bedrooms, unless staff observation is required for clinical purposes
- Rooms requiring acoustic isolation, unless glazing can achieve the required room acoustic privacy
- Rooms requiring a high level of patient or staff privacy such as Consult Rooms

Observation glass should have a cover to fully obscure the vision panel in the following areas:

- Operating and Procedure Rooms where laser may be in use or for additional privacy
- X-ray or imaging rooms with radiation shielding
- Rooms with electromagnetic shielding

The vision panel cover should be operable from inside the room.

6.8 Automatic Doors

Beam activated automatic sliding or swing doors are considered highly desirable in areas where there may be a large volume of movement such as Main Entrances and delivery points. Automatic doors may also be used in areas where rapid, hands free access is preferred, such as entries to the Emergency Unit or the Operating Unit.

Automatic doors, particularly if required for emergency egress should be installed according to UAE Fire and Life Safety Code and applicable standards. Where installed, attention should be given to allowing sufficient time for doors to open and close for people with determination, frail and paediatric patients and visitors.

Automatic doors are not mandatory.

6.9 Sliding Doors

Surface sliding doors may be used and installed in accordance with UAE Fire and Life Safety Code and Dubai Universal Design Code, providing that fire and other emergency exiting requirements are not compromised.

Sliding doors should be used with caution due to difficulties with cleaning, maintenance issues and acoustic issues. If installed, sliding doors should be of solid core or metal frame construction to resist warping and therefore locking.

Sliding doors should have tracks on top only. Floor tracks should not be installed as they tend to collect dust and dirt and are difficult to clean. A small floor guide attached to the frame is acceptable and recommended for providing efficient operation.

Surface sliding doors are permitted to Patient Toilets provided that the door cannot be locked from the inside and does not conflict with other requirements, such as access for people with determination.



Cavity sliding doors (also known as pocket doors) may not be used in the following areas due to the difficulty in cleaning and decontaminating the door and the cavity:

- Patient care and treatment areas including Bedrooms, Lounge areas, Treatment rooms, Procedure rooms, Operating rooms
- Patient Toilets, Ensuites, Bathrooms or showers where a patient may fall against the door and prevent it from opening
- Sterile Supply Unit or rooms used for sterile stores
- Laboratory Unit
- Patient diagnostic areas including medical imaging, investigative and testing scanning areas
- Catering Unit
- Mental Health areas



Figure 6.14: Surface mounted automatic sliding doors to Anaesthetic and Operating Rooms



7. Grab Rails & Hand Rails

7.1 General

In corridors accessed by patients, a grab rail/ hand rail is required on both sides of the corridor.

To be effective, hand rails suitable for patients and people with disabilities must be within the design criteria set out as follows:

- Clearance of the top arc of 270° is to be achieved throughout the full length of the handrail
- Rail ends should return to the wall or floor
- Hand rails should have eased edges and corners
- Handrails are to be 30 – 50mm in diameter spaced 50mm from the support wall or balustrade. Where an elliptical handrail is used the horizontal dimension must be the larger
- Ends of handrails at the bottom of stairs and ramps extend beyond the last riser for the depth of one tread and ends of the ramp or top riser and then horizontally for at least 300mm (Refer to Figure 6.5 below)

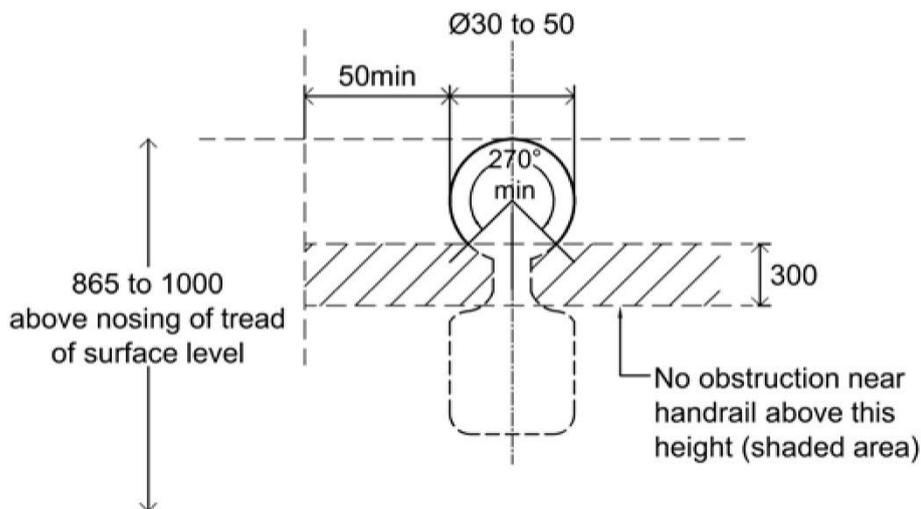


Figure 7.1: Section through handrail showing clearances

Compliant handrail installations and mounting brackets are demonstrated in the figure below



Figure 7.2: Compliant handrail examples

Non-compliant hand rails examples are demonstrated in the figures below showing inadequate clearances, inappropriate width and profile and rails that do not return to the wall.



Figure 7.3 Non-compliant handrail examples

The following hand rail example is compliant but not recommended. The downward projection of the mounting bracket could be a hazard to unstable users.



Figure 7.4: Compliant but not recommended hand rail mounting brackets



Figure 7.5: Compliant, stair hand rail with return to the wall



Figure 7.6: Compliant, rail extends beyond the stair

7.1.1 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 handrails in Mental Health Units should 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.

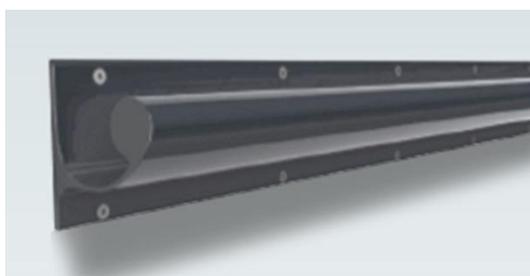


Figure 7.7: Anti-ligature corridor handrails

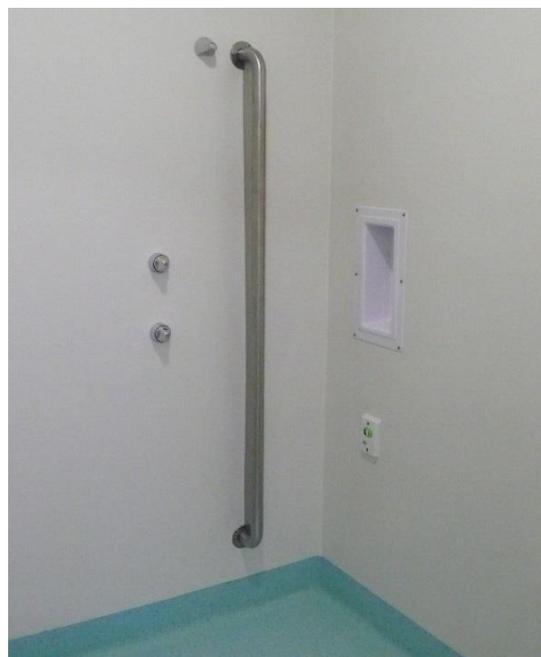


Figure 7.8: Anti-ligature shower grabrail



7.1.2 Outside Corners

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

7.1.3 Balconies, Balustrades and Upstands

It is vital to ensure patient, visitors and staff safety in all healthcare facilities. Balconies can present the risk of fall from great heights through negligence, children’s playful behaviour or sometimes deliberately. As a result, in Hospitals the provision of accessible balconies (internal or external) is not recommended by these guidelines in general and prohibited altogether in all mental health facilities.

Balustrades, if provided (not in mental health facilities), may be to voids (including multi-storey high atrium spaces) or the perimeter of external areas (terraces, balconies etc.). If the potential fall to the ground or floor slab is more than 4m, the following guidelines provisions are required:

Balustrades and Upstands must be child-proof, anti-ligature, and free from any foot-hold components up to 1m above the finished floor level. The total minimum height of Balustrades and Upstands should be 1.6m above the finished floor level.

The following diagram indicates 3 alternatives which comply with this requirement.

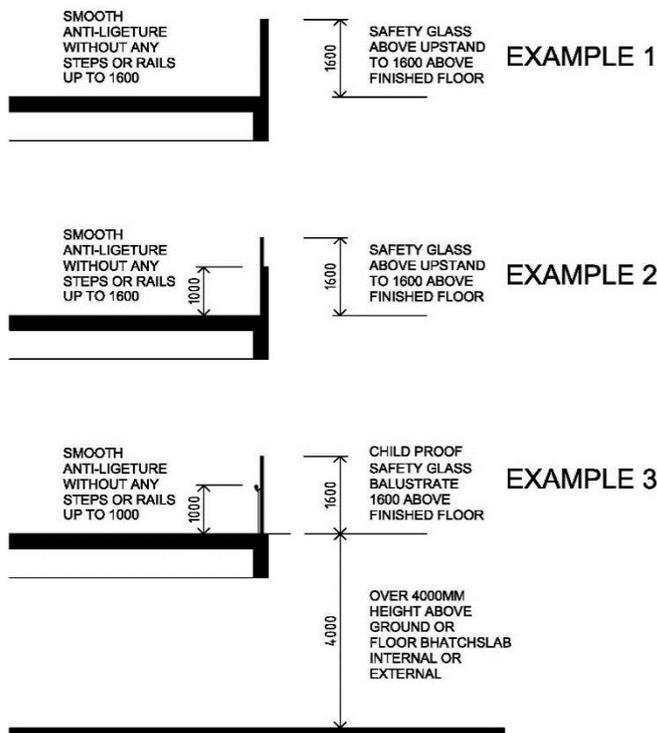


Figure 6.9: Design of suitable balustrades/ upstands

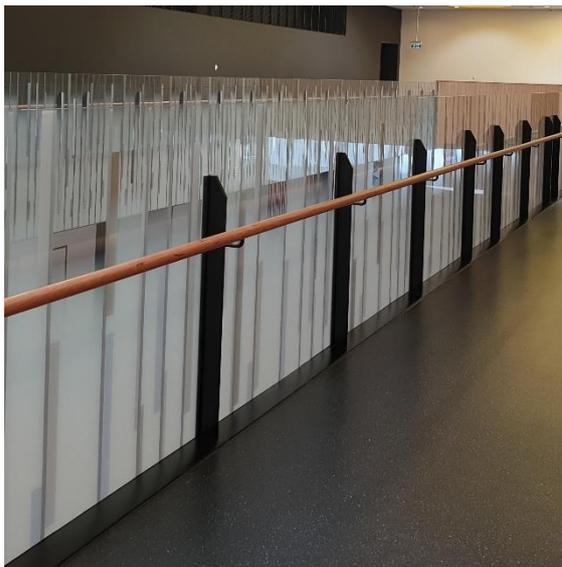


Figure 6.10: Sample of suitable balustrade

If patient access to external areas more than 4m above ground is permitted by the Facility, a staff member must always supervise the patients. Ideally, access to external balconies and terraces by the patients should be minimised or avoided altogether. It should be noted that in some circumstances the Hospital insurance policy may be adversely affected if balconies with patient access are provided.

The above requirements do not apply to areas accessed only by the staff. In those areas, only the requirements of the Building Code may be applied.



8. Windows and Glazing

8.1 General

All rooms occupied by patients or staff on a regular basis require 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. An internal atrium with artificial ventilation will be acceptable if the area is more than 220m² with a minimum dimension of 14 metres and includes suitable permanent landscaping. The width to height ratio of the atrium must not be 1:1.5 as indicated in Figure 8.1.

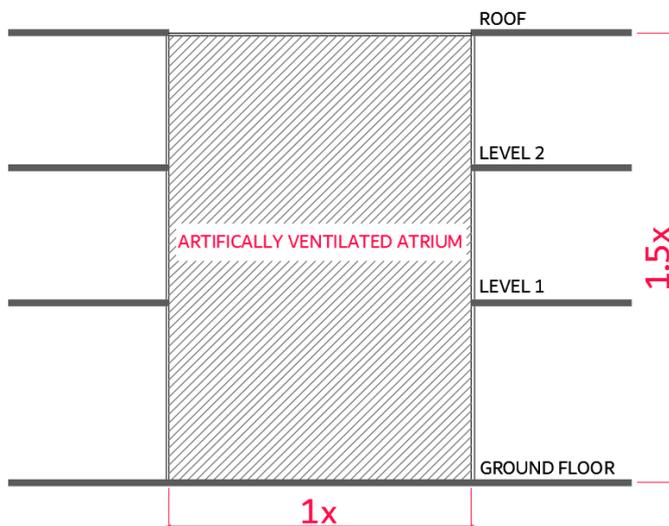


Figure 8.1: Width to Height Ratio in Artificially Ventilated Atrium

This requirement does not apply to patient bed areas in the Operating Unit, Emergency Unit, ICU and similar areas.

Window size and treatments can have a significant impact on the energy performance of a building. Careful consideration must be given to the energy performance of the building balanced against patient comfort such as natural light, vision out to the surrounding landscape and thermal comfort.

8.2 Window Types

8.2.1 Fixed windows

Fixed windows are typically installed in healthcare facilities with air-conditioning systems. Fixed windows will require consideration of external window cleaning systems.

In health facilities, it is acceptable to have all windows as fixed windows.



8.2.2 Openable windows

Openable windows may be provided for ventilation including to patient areas. The inclusion of openable windows may also aid in energy conservation as air-conditioning systems may not be required during the whole day or particular seasons of the year.

If it is preferred that patients not be allowed to open windows to avoid problems with air-conditioning, then the opening section of the window should be locked and operated by staff only.

Openable windows should have provision to restrict the degree of opening with either stop/ limit/ restrictor hardware or an open guard/ screen to prevent passage of objects of a similar size to a 150mm diameter sphere through the opening. Locks should be heavy duty, affixed to both sides of awning windows and fixed securely through the frame with tamper proof fixings.

Opening sections of the window may be provided with an insect screen as permitted by DHA and Municipality Codes and Regulations.

8.2.3 Awning Windows

Awning windows are also known as 'hopper' windows. These refer to windows hinged from the top. Awning windows should not be used in multi-storey buildings because they can act as smoke/ heat scoops from fires in storeys below.



Figure 8.2: Fixed windows in corridor



Figure 8.3: Awning window

8.3 Size

Each required external window and/ or external glazed door should have a net glazed area of not less than 8% of the floor area of the room concerned.

If opening window is considered instead of mechanical air conditioning for parts of the year, then the minimum aggregate window opening should be determined for the required air flow and changes per hour.



8.4 Cleaning

Window cleaning requirements consistent with Municipality guidelines and standards should be considered. The following options are provided for information:

- Inward opening and pivoting windows allow the outside surface of the window to be cleaned safely while standing inside the building
- With alternate fixed windows and 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 ledge or balcony may be provided only for window cleaning with no patient access. If no hand rail is provided, a continuous harness system should 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 able to be reached from a terrace
- Hospital management may enter into a window cleaning contract with a contractor who uses absailing, mobile scissor lift or similar lifting device

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



9. Floors

9.1 Floor Finishes

9.1.1 General

This section of the Guidelines addresses issues related to floors that are concerned with Occupational Health and Safety. Refer to Part D for issues related to Infection Control.

The selection of floor finishes is very important. It has direct impact on the safety of patients, staff and visitors. Floor finishes also contribute to the recurrent costs of a facility related to cleaning and maintenance; a low initial cost of a particular floor finish may have a high ongoing cost impact.

Fire Safety

Floor finishes must comply with UAE Fire and Life Safety Code and Dubai Universal Design particularly related to fire safety. This is applicable to new installations and renovations requiring replacement of floor coverings.

9.1.2 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 organise for realistic onsite tests before making major decisions. The following are general guides to making this decision.

Design considerations include:

- Floor finish characteristics such as wear resistance and cleanability; floor finishes should be impermeable, sealed, easy to clean, scrubbable, able to withstand chemical cleaning have an integral base
- Management policy and maintenance practices (frequency, type and effectiveness of cleaning equipment)
- All floor surfaces in clinical areas should be constructed of materials that allow the easy movement of mobile equipment
- Floor finishes should be selected to conform to imaging equipment technical requirements (e.g., electrostatic dissipation), infection control requirements, and service limitations (e.g., no powered floor cleaners are to be used in MRI scanner rooms)
- The amount and type of expected traffic (vehicles, trolleys, people hurrying, elderly, people with determination with or without walking aids and children)
- Consequences of exposure to contaminants including environmental design factors (visibility issues and contamination minimisation)
- Compliance with Occupational Health & Safety requirements



- Special provision of textured or studded flooring for areas with high potential for slip hazards
- Alternative information sources and relevant standards (use of contrasting colours, tactile indicators and warning signs where applicable)

Manoeuvrability

The floor finishes chosen should make the movement of objects such as trolleys, bed trolleys and wheelchairs sufficiently easy to minimise the potential for 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 with rubber backing 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.

Acoustic Properties

Carpet type finishes not only minimise 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 minimising noise generation but it does not dampen other noises as effectively as carpet.

Hard surfaces such as ceramic tiles, terrazzo, laminates or similar finishes generate noise from walking staff and visitors, impact such as dropped items and also reflect noise from other sources.

OH&S Issues

In areas where staff must stand for long periods of time, finishes should be chosen that do not contribute to staff fatigue. Carpets and vinyls, cushioned and standard are widely considered to be acceptable for lengthy standing. Hard surfaces such as tiles, terrazzo or finished concrete are considered to be too hard for lengthy standing over several hours and alternatives are recommended in staff work areas. Hard resilient surfaces may be used in public areas or other areas such as cafeterias, foyers, atriums and courtyards.



Cleaning

Floor finishes selected should be resilient to wear particularly in high traffic areas, and be easy to maintain and clean in order to minimise operating costs.

9.2 Anti- static / Conductive Flooring

A distinction must be made between antistatic and conductive flooring. Antistatic 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 anaesthetic agents. These types of anaesthetics are no longer in use, so the requirement for this type of specialised flooring no longer applies in Operating Rooms or Anaesthetic Rooms.

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 with live computer components or a worker in a specialised micro-electronics laboratory, anti-static mats may be used which more than adequately provide the necessary barrier.

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

9.3 Slip Resistance

Slip resistance is governed by the nature of the anticipated activity. Safety considerations of floor finishes must address all the relevant variables; slip potential is a function of footwear, activities, gait, contamination, environment and other factors.

Selection of floor finishes should consider the slip resistance suitable for the specific location the floor finish will be used. Appropriate floor finish applications include the following:

- Standard slip resistant vinyl may be used in areas where the floor is dry and those using the floor will be wearing shoes.
- Standard textured vinyl is similar to standard slip resistant vinyl but provides greater dry condition slip resistance and may be used where floors may be intermittently splashed with water.
- Studded vinyl flooring provides a higher level of slip resistance, is rated non-slip, is easy to clean and suitable for wet areas with bare feet applications such as patient showers; non-slip finishes in Ensuites and Bathrooms need to consider the use of fine powder such as talcum powder.
- Safety vinyl flooring rated non-slip is suitable in wet areas where trolley movement is also expected, such as SSU Decontamination Areas and Dirty Utilities; this type of safety floor may



be composed of vinyl with metal fragments and is not suitable for bare feet applications.

- Ceramic tiles with an appropriate slip resistance may be used for Ensuites and Bathrooms, but not clinical areas requiring seamless finishes. Smaller ceramic tiles generally provide greater slip resistance. The best combination of slip resistance and easy cleaning is commonly referred to as textured which has an 'orange peel' finish.
- Stone and terrazzo may not be slip resistant and if used in areas such as foyers and lobbies may be treated with non-slip chemicals to improve the slip resistance.

Slip resistance is also an important consideration for ramps and stairways.

9.4 Floor Joints

Thresholds and expansion joint covers should be flush with the floor surface to facilitate the use of wheelchairs and trolleys. Expansion and seismic joints must be constructed to resist passage of smoke in accordance with Municipality Building regulations and Standards.



10. Further Reading

- American Institute of Architects and The Facility Guidelines Institute, Guidelines for Design and Construction of Health Care Facilities; 2014 Edition; refer to website www.fgiguilines.org
- British Standards BS 8300:2009 Design of buildings and their approaches to meet the needs of disabled people. Code of practice. Refer to website <http://shop.bsigroup.com/ProductDetail/?pid=000000000030139436>
- Ceilings & Interior Systems Construction Association (CISCA). 'Acoustics in Healthcare Environments, October 2010. Refer to website : http://www.cisca.org/files/public/Acoustics%20in%20Healthcare%20Environments_CISCA.pdf
- Department of Health (UK) HBN 00-01: Designing Health and Community Care Buildings, 2014, refer to website <https://www.gov.uk/government/collections/health-building-notes-core-elements>
- Department of Health (UK) HBN 00-04: Designing Stairways, lifts and corridors in Healthcare Buildings, 2013, refer to website <https://www.gov.uk/government/collections/health-building-notes-core-elements>
- Department of Justice (US) ADA Standards for Accessible Design, 2010, refer to <http://www.ada.gov/>
- Dubai Health Authority. Dubai Universal Design Code, 2017. Refer to <https://www.dha.gov.ae>
- Hunt, J & Sine, D, National Association of Psychiatric Health Systems, Design Guide for the Built Environment of Behavioural Health Facilities, April 2014 Edition 6.2 refer to website <https://www.naphs.org/quality/design-guide-for-the-built-environment>
- International Labour Office, Geneva/ International Ergonomics Association, Ergonomic checkpoints, 2nd Ed. 2010; refer to website : <http://www.ilo.org/global/publications/lang--en/index.htm>
- The Joint Commission, Improving Patient and Worker Safety, 2012, refer to website http://www.jointcommission.org/improving_Patient_Worker_Safety/
- US Department of Veteran Affairs, Architectural Design Manual, August, 2014, refer to website <http://www.cfm.va.gov/til/dManual/dmARhosp.pdf>