

## 2.0 Ergonomics

### 2.1 General

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

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

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

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

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

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

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

### 2.2 Disabled Access

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

Parts of the facility may be 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 be sized and designed for use by people with disabilities regardless of the anticipated number of patients with disabilities. These are covered in the relevant sections of the FPU's in part B. The balance of these ergonomic guidelines covers the average use of facilities by able bodied persons.



## 2.3 Standards Table

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

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

## 2.4 Staff Station

### 2.4.1 General

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

- A clerical workstation
- Reception
- Staff base
- Reporting station or sub-station
- Dispensing counter
- Servery

Part of a typical Staff Station is used as a workbench or workstation. For the ergonomic standards of these functions, refer to the appropriate sections of these Ergonomics guidelines. The balance of the Staff Station standards are covered below:

### 2.4.2 High Counter

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

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

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



The recommended height to the top counter used against a work surface designed at 900 mm to 1000 mm is between 1200 mm and 1250 mm above the floor level.

#### **2.4.3 High-Low Design**

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

#### **2.4.4 Security Barriers**

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

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

If the Staff Station or counter is the only barrier between a department and outside areas, it may be necessary to provide after-hours security. If a full height barrier such as security glazing has been provided as described, this may be sufficient. Alternatively, a lockable security grille or similar device should be provided. The grill or similar device should be operable by the staff from the normal standing height.

## **2.5 Workbench**

#### **2.5.1 General**

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

#### **2.5.2 Sitting Position**

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

#### **2.5.3 Standing Position**

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

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

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



### 2.5.4 *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 700 mm below the height of the counter, and recessed by about 150 mm to prevent striking by shins.

### 2.5.5 *Bench Support*

Many people tend to sit on the edge of the bench from time to time. It is important to support the bench with robust materials to avoid the collapse of the bench and become a danger to users. The support may be gained by using sufficiently thick and sturdy materials such as 32 mm 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 50 mm. Supports should be designed to minimise contact with the user's knees.

### 2.5.6 *Adjustable Keyboard Shelves*

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

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

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

The following potential problems should be acknowledged:

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

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

## 2.6 Workstation – Typical

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

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

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

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

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



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

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

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 underbench units does not result in hitting the knees against these units.

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

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

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

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

## 2.7 Computers

### 2.7.1 *General*

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

### 2.7.2 *Computer Monitor*

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

### 2.7.3 *Monitor Position*

Within the work surface depth defined in these Guidelines, the exact horizontal location of the monitor should be adjustable to suit different users. The vertical position of the monitor will depend on the height of the user. The best option is for an adjustable monitor arm. These are, however expensive and are not recommended for all conditions. For most users, a fixed monitor is acceptable. The angle of view to the 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.

### 2.7.4 *Laptops*

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



## 2.8 Shelves

### 2.8.1 General

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

### 2.8.2 Depth (Front to Back)

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

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

### 2.8.3 Reach and Spacing

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

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

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

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

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

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

Note: In heavy use areas of hospitals, the conventional metal pins inserted into joinery walls often fail. In such situations, proprietary metal strips are recessed into the joinery walls to hold shelf support pins.

### 2.8.4 Strength

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

### 2.8.5 Disabled Access

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



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