Designing for the disabled

Introduction

The following information provides designers with guidelines for designing plumbing services for the disabled community. It includes information on access to buildings which apply whether the building is large or merely a small toilet. More specifically it gives details of measurements required for WC compartments.

In the case of the compartment, passage ways and door sizes, the figures given are the minimum size required. Additional space is recommended wherever possible.

Approaches to buildings

Facilities for the disabled should be marked with the internationally agreed disabled sign.

Figure 1 Disabled sign

Parking spaces

Parking spaces should be close to an accessible entrance and preferably on the same level (ramps are permissible but may be tiring for wheelchair or Zimmer users). If possible, they should be under cover with covered access to the building and there should be adequate extra space for the transfer from car to wheelchair.

Dropped kerbs

These should be 1400mm wide with a gradient of at least 1 in 12 and should be placed where there is a merging of roadway and pavement.

Stepped access

This is not permissible under current government requirements.

Level/ramped access

Should be provided at one entrance from the adjacent street and car parking spaces with access to the toilet facilities. Ramps should be a minimum width of 1200mm with a maximum gradient of 1 in 12 and having an unobstructed platform of 1200 square millimetres. Resting places should be provided at intervals if the approach ramps are longer than 3 metres and near the maximum gradient of 1 in 12.

Handrails

Handrails should be provided on both sides of a ramp, or in the centre if its width exceeds 2000mm, and/or where the gradient exceeds 1 in 15. They should be easy to grip firmly with a circular diameter of 45-50mm.

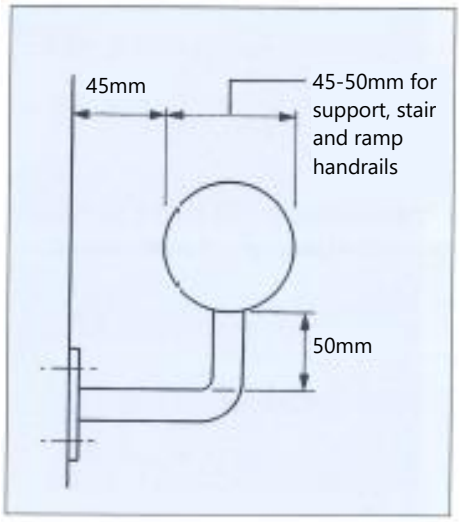

Figure 2 Handrail dimensions

Entrance doors

These should have a clear opening not less than 980mm wide and an auxiliary side hung door the same width should be provided if they are revolving. The doors should be easily swung and any spring or hydraulic damper provided must allow easy access for the wheelchair user.

Automatic entrance doors

These are preferable in certain circumstances but they should have a minimum clear distance of 2100mm between sets for sliding doors and 2500mm for swing types.

Inside buildings

Double swing doors

These are preferred in circulation areas.

Glass doors and other glass areas

Should be made easily identifiable to those with defective vision.
They should never be used in areas/institutions where wheelchair users are prominent.

Sliding doors

May be necessary in bathrooms and WC compartments. They should not be less than 900mm wide. They can however have disadvantages as adjacent wall space is rendered useless, there is poor acoustic insulation and the typical sliding gear used with low cost doors does not easily withstand disabled usage and may be pulled across the line of the operating track. People in wheelchairs prefer swing doors to sliding doors.

Internal doors

These should have a clear opening of not less than 900mm. On the leading face of side hung doors there should be a clear wall space or panel equivalent of 300mm.

Kick plates

These are not essential but are recommended to be fixed to the trailing face of side hung doors as they can help to minimize damage to the building finishes. The plates located at low level to a height above the wheelchair user's foot rest level together with another plate at centre of side wheel level to prevent the wheels from damaging finishes.

Thresholds

Thresholds must be flush without steps or upstands to comply with statutory requirements.

Spring closers

These should be avoided but delayed action types are preferred if they are essential. Their spring should be of released tension to allow use by a disabled person.

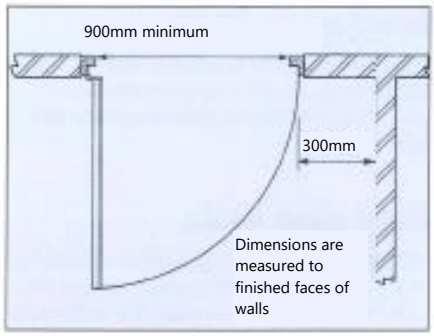

Figure 3 Dimensions - internal doors and adjacent areas

Door handles

Door handles should be approximately 1040mm above floor level and of the lever type, robust, sufficiently large diameter in size to grip and easy to use.

Switches

Switches for lights should align with the door handles and be no higher than 1200mm above the floor level. For lifts, touch light controls are preferable, with embossed digits to enable identification by blind people.

Internal circulation areas

There should be a wheelchair access at the same level as an accessible entrance door, or at the same level as a lift. Changes in level by ramps are permissible. Ramps no greater than 1:15 slope.

Passage ways

Passage ways should not be less than 1200mm wide.

Floors

Floors should have a slip resistant surface (wet or dry). There should be no simulation of steps in the patterning.

Hazards

Hazards such as level variations and projections or obstructions such as floor drainage gullies and upstanding access and manhole covers must be avoided.

Level changes

Level changes should be easily identifiable by lighting and colour texture contrasts.

WC compartments in public buildings

At least one unisex public lavatory accommodation should be provided in:

Entertainment facilities

Concert halls, theatres, cinemas, recreational buildings, leisure and sport facilities.

Travel facilities

Transport buildings, principal railway stations, road service stations, air terminals.

Commercial buildings

Shopping centres and large department stores. At least one unisex staff lavatory accommodation should be provided in large office buildings and buildings related to other types of employment.

In addition to the above unisex facilities where one assistant can aid the disabled person, supplementary facilities should be provided in large buildings.

Points to consider for WCs in the Disabled Persons home

a. If the upstairs WC is inaccessible, a stairlift should be considered if it enables other rooms to be used. Also, if there is sufficient space in the WC the door could be re-hung; a sliding door should not be fitted. If the WC is in an adjacent room, an additional WC could be incorporated into the bathroom.

b. If the only WC is external to the building, considerations should be given to either covered access to it or a one sided protected walkway installation. Grant help may be available through the Environmental Health Department (for private housing) or the Local Authority (for council housing).

c. Strict building regulations apply if a new WC is installed and these must be checked with the Environmental Health Department. Utilizing space downstairs may necessitate the fitting of extra doors, additional ventilation and special consideration for under stairs installation.

d. Where there is no suitable downstairs space available, consider installing a ground floor bathroom or shower room extension incorporating a WC suite. All work must comply with the Building Regulations. Allowances must be made for the specific needs or future needs of the disabled person, such as level access, manoeuvring space, attendance helper, etc.

e. When installing a new WC installation check that the seat height is suitable for the user, securing it on a raised plinth as necessary. Check with the disabled person first to find out what their needs are before finally installing the sanitary fitting.

f. A wall-hung WC pan must be fitted with a spacer box. This type of pan allows for complete floor cleaning.

g. A low-level cistern affords some back support and may be useful for those with poor balance but can impede others who have stiff hips. It is very difficult and often impossible for disabled people to flush a low level cistern using a handle behind their seated position.

h. A slim-line cistern provides more space for those with stiff hips or for a helper assisting with body cleansing.

i. The WC appliance with a warm water douche and warm air-drying facility can provide independence in personal cleansing for some severely disabled users. The installation of this appliance requires Building Control approval.

Access to WC compartments

All recommendations for passage width, floor types, etc. are detailed in the preceding paragraphs. It is most important that a route is available to the toilet area having suitably sized doors and openings of minimum clearance of 900mm wide along which the disabled person travels to the compartments. Remember no steps, ridges or steep changing floor levels.

The WC compartment should be provided with access to allow wheelchair approach to all the facilities which should include the WC, flushing unit, hand basins with taps, towel dispensers (or hand dryers), sanitary towel disposal units and mirrors.

Access through lobbies and openings

This is not recommended but where it is essential, room should be allowed for a wheelchair to manoeuvre. Standard wheelchairs need 1800 by 1400mm to turn 180°.

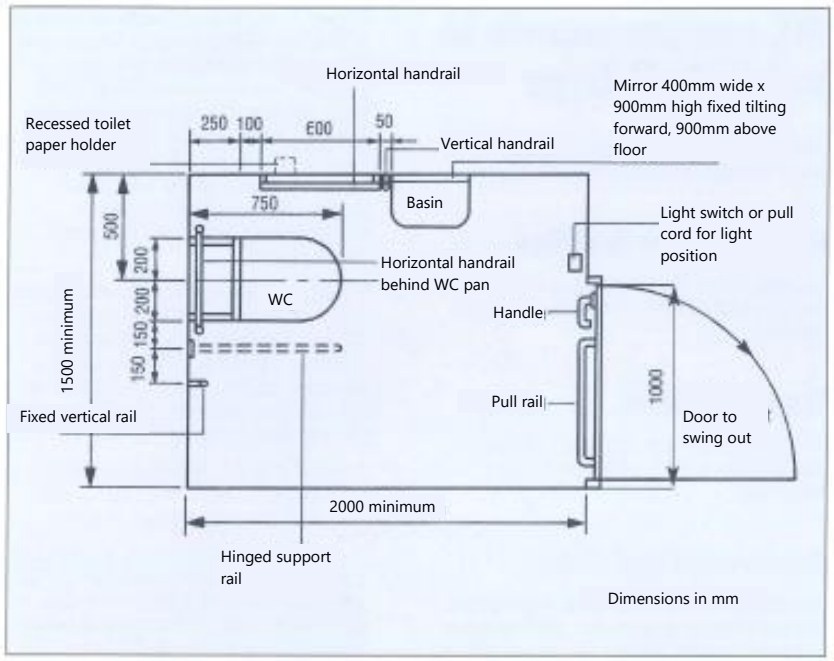

Figure 4 Dimension of WC compartments and facilities

Note should be made that wheelchair lengths vary between 945mm and 1150mm with the width between 550mm and 675mm. It must also be remembered that the disabled person's feet extend in front of the wheelchair and their arms and especially their fingers to operate the wheelchair.

Dimensions

The WC compartment should not be less than 2000mm by 1500mm.

Door

This should be 1000mm clear wide, open outwards (so that the doorway is not blocked if a person inside falls), have a pull rail and handle, or it should slide. It should only open inwards if there is 1100mm by 700mm of unobstructed space inside it to allow a free door swing with the wheelchair, which has to be manoeuvred backwards at the same time as pulling the door open.

The door must be unlockable from the outside in the event of emergency and assistance needed by an attendant.

Support rails

50mm minimum diameter support rails should be provided on all sidewalls adjacent to the WC with a hinged horizontal rail of 300mm minimum length on the exposed side. If the design is for an individual disabled person the rails may be placed according to their specific requirements.

The mirror can equally be positioned above the basin to save movement within the cubicle. The basin can also be used to support make-up and toiletry items.

Toilets

These should be placed with the seat of the WC at 450-475mm above floor level to top of seat to allow easy transfer from wheelchairs. Preferably the WC should be placed to allow a lateral transfer from the wheelchair, which is placed to one side, or possibly a frontal transfer, in which case a pedestal unit should recede towards floor level to ease transfer. Side transfer should be designed in preference to front.

The flushing device must be easy to operate and must not be higher than 1200mm above floor level. It may be possible to place the flushing device on a side wall within easy reach.

It is poor practice to design the flushing operating device/handle behind the disabled person.

If users are likely to be too severely handicapped to be able to clean themselves, an installation of a proprietary WC/bidet (closomat or medic- loo type of unit) should be considered. These have a warm douche and warm air for drying. These units need a relaxation from the Water Company and Building Control before installation.

Toilet paper holder

Place on the side closest to the WC seat within easy reach. It is advisable to design the holder to accommodate two rolls of paper.

Hand rinse basin

Where practical, this should be placed so that it is usable whilst seated on the WC pan. If it is not within reach the individual has to transfer back into the chair before washing their hands and so fouls the chair's arm rests and wheel runs used for propulsion. The basin should be at a height of 750mm.

Do not install shallow basins with pedestals. Vanity units can be suitable for wheelchair users with built into the wall types most useful and practicable. It is possible to get an adjustable height basin, such as the 'Zoom' basin, or items which tip at the front, such as the 'Ifo tilting' wash basin.

Hand dryers

These are preferable to other less hygienic methods of drying the hands, such as paper towels or roller towels. They should be set at a temperature of not more than 35°C and have a cut-out switch when this is exceeded. There are a number of automatic dryers on the market that work by remote sensor; there is also a selection of less recommended models operated by 'soft touch'.

Mirrors

The lower edge should not be higher than 900mm above floor level. Mirrors should be tilted to an angle to enable the wheelchair user to use it together with a standing person. Flat on wall mirrors are not suitable.

WC seats

These should be of a robust material and must not deform when sat on. The seats should be manufactured to British Standards Specification and kitemarked. The 'flimsy' type of WC seat which deforms and moves when sat on must not be used as it could cause accidents during transfer operations. Also accidents can occur during use, resulting in personal injuries, including cuts which result in the disabled person having pressure ulcers.

A raised seat should be adjusted carefully to fit the WC securely and the user or a helper should check frequently that the fittings are secure.

Restricted space

In a building whose size makes it impractical for a unisex compartment to be installed, the recommended minimum dimensions should be not less than 2000mm by 1500mm. This can result in a limited manoeuvring space, however lateral transfer can be accommodated.

Additional facilities

Where there is already a unisex toilet compartment and wheelchair users require additional toilet accommodation it is recommended that a WC compartment 2000mm by 1500mm minimum dimensions be installed.

Macerating WC boxes and WC pans

These electrical mechanical units cannot dispose of sanitary towels or incontinence towels and must not be fitted to WC pans used by the disabled community, unless strict disposal management control is imposed.

WC facilities for ambulant disabled

Supplementary facilities for ambulant disabled should be provided in large buildings as for the wheelchair disabled users.

Washbasin fittings

Taps may be paired, with cross-tops, levers, short (or long), quarter turn levers, single lever mixer types or electronic taps.

Electronically operated taps are operated by the user placing their hands under the spout which activates a remote sensor. The remote sensor should be adjusted to suit the application. Combined mixer, separate hot tap, bidets and all other hot water application temperatures should be set at not more than 35°C by the use of a thermostatic valve to maintain an even safe temperature to prevent scalding. Some disabled people are not sufficiently sensitive to temperature to realise when the water is too hot and for such applications, the advice should be sought from the disabled person's medical professional as to the maximum temperature the mixed water should be set to.

Mixer fittings with swivel arms can be moved to the side to leave the sink bowl area free.

Taps can be wall-mounted, which necessitates reaching forward, set into the basin or into the surround. Controls can be fitted to the front of a vanity unit to allow remote control of the tap outlets.

High-necked fittings provide more space when hand-washing and can facilitate cleaning.

In a domestic facility, choose taps which are suitable for the individual, carefully assessing the action required to operate each type.

Long-handled lever taps require less power to operate but need a wider arc of movement than short-handled levers.

Pressure handles vary in the pressure needed and must be held in position to operate. The springs must be reduced in tension for the disabled.

Mixer taps may be dangerous if heat sensation is impaired or if the person is confused.

Foot-operated pressure pads may be useful for some with upper limb disabilities, but they require good balance to use. They are not suitable for wheelchair users.

Knee-action valves are available for those who cannot manage taps and these can be operated from wheelchairs.

Tap turners are a cheaper alternative to fitting new taps for general home use and can be useful when away from home.

Basin plugs with short chains tangle least and may be easier for the disabled user to reach than the longer type.

Central column fitting plugs can be operated with a push and pull movement. Control knobs are easier to handle than a chain but are smaller than most tap handles which cause arthritic disabled people severe problems.

WC levels in private facilities

Considerations

The required overall height should be checked for the individual user.

The comfort of the seat for the individual user should be checked.

Wooden seats may be preferred for comfort by some users and may be more stable than plastic seats for some types of transfer.

Most raised seats can be removed for normal use of the WC by able bodied and for cleaning.

Check that the seat fittings are easy to clean.

Some users may require carefully positioned grabrails or a WC support frame to help them transfer on and off the seat.

A padded WC seat may be of help to those with sensitive skins and those prone to pressure sores. Regular dusting with talcum powder helps to prevent the seat from becoming hot and sticky. A raised seat with one cut-out side may be suitable for a person with a stiff hip.

A person with two stiff lower limbs or extremely weak upper limbs may be helped by a self-lifting seat or angled seat fixed to a frame support. Both should be adjusted carefully to the individual and are suitable for those with poor balance.

Selection of raised toilet seats

The seat should preferably be fixed to the WC pan by brackets: in certain situations removable seats are useful, however seats that are not securely fixed can be dangerous.

The method of fixing should be easy to carry out.

The fixing brackets should not damage the WC Pan.

The seat height must be assessed for each individual and a seat should be supplied which, when placed on the WC pan, provides this height. Some disabled people require a seat height of between 475-550mm.

A convex seat rim is more comfortable than a concave one.

The surface finish of the seat should not adhere to the skin even after prolonged sitting.

To allow easy access for personal cleansing the aperture length should preferably be 300mm.

Facilities for private use and nursing homes

Bathroom layout

The layout will depend on various factors including the severity of the disability and the amount of assistance necessary, the size and type of house and the potential space, the financial assistance available, the needs of the family, the method of transfer and the type of hoist and other appliances.

The height of the fittings may not be ideal for the disabled user but a compromise may be necessary to reconcile their needs with those of other members of the family.

Because of the longer time taken by the disabled member to carry out their toilet needs, separate WC and washing facilities are recommended.

Grants may be available for major adaptations and applications should be made to the Local Authority's Environmental Health Department for private housing and to the local council's Housing Department for council housing.

Spacing

Doors may need repositioning to provide quick, direct access from the bedroom or living room to the WC compartment without negotiating corners and landings.

An ambulant person usually prefers the security of a relatively confined space with carefully positioned and easily reached grabrails.

A wheelchair user will require space for manoeuvring and it may be necessary to remove non-loadbearing walls between the bathroom and WC.

Space will be needed to manoeuvre a portable hoist and the bath panel may be removed to accommodate the hoist legs. Where space is inadequate, a floor-fixed base plate into which the hoist mast can be fitted, could be suitable.

The ceiling joists will need strengthening before an overhead hoist track is fitted.

A straight track from the bedroom to the bathroom spanning the bed, WC and bath may be ideal for a severely disabled person.

The electricity supplier should be consulted before the installation of an electric hoist.

An electric hoist must operate from 24 volts voltage supplied through an approved double-wound isolating transformer.

The transformer must be installed outside the bathroom, properly enclosed with a permanently wired connection to the electricity supply.

Space will be necessary to hang towels and clothes.

Doors

Depending on the space available doors may open inwards or outwards. All doors should have emergency release fittings.

Sliding doors are not recommended however they may be suitable alternatives where space is limited.

All locking doors must be fitted with a lever-operated indicator bolt with an external emergency release.

Door openings must be a minimum of 900mm clear opening width to accommodate the wheelchair user.

Flooring

Anti-slip flooring such as vinyl sheeting incorporating abrasive grains of aluminium oxide or anti-slip surface tiles are suitable. Carpets designed for bathroom use may be appropriate in some cases.

A damp-proof membrane should be laid beneath the flooring and extended 80mm up the wall to prevent water seepage.

In shower areas, either covered tiles or PVC covering at walls with upstands should be fitted.

Mats should be removed as they are a hazard for an ambulant person together with being an obstruction to a wheelchair.

Fittings

Sanitaryware must be appropriate for the user and correctly positioned for their use.

An emergency call system may be necessary.

Users with disabled hands should be provided with pull-ring fittings to pull cords for switches. Alternatively provide personal sensors activating the lights.

Shaver points and mirrors should be 1200mm above the floor level and accessible for the user.

Suitable soap holders and twin toilet roll holders must be accessible and at the correct height for the user.

A storage area for toilet accessories must be provided.

Grabrails

Grabrails will be needed alongside the WC, bath, shower and the basin. A front rail at the basin may be needed to prevent the basin rim being used as a support.

Rails must be positioned for the individual and placed so that accidental misuse of the heated towel rail is avoided as this could be potentially dangerous.

Heating

The bathroom temperature should be maintained at a higher level than the rest of the home for the disabled person's comfort (see reference to heating for the disabled in this section).

Only heaters approved for bathroom use should be used. They should be fixed above head height to avoid the risk of burns, especially to those with impaired temperature sensation.

Extractor fan

This should be provided to remove condensation together with toilet smells. There needs to be a permanent fresh air supply passing under the door into the room with undercut space or permanent open low level inlet with privacy grilles. This is in addition to the statutory requirements. The permanent fresh air inlets must be as required by the extractor fan manufacturer's installation requirements.

The extractor fan should be fitted with humidity control stat to operate the fan together with wired-in timer control to over-run for at least 20 minutes.

Bathing

Points to consider before alteration

Investigate all possible alternatives before altering bath or shower facilities. An adaption of a preferred arrangement will often be more acceptable than a totally new one, especially to the elderly.

If access to an upstairs bathroom is a problem, consider a stairlift or through- floor lift especially if the person is able to use other rooms upstairs. This is often more economical than building an extension and a lift can be re-sited if the person moves premises.

The bathroom door can be re-hung to open outwards if equipment is bulky or if wheelchair manoeuvring space is needed.

Alternatives should be considered carefully. A bath with a low side may make getting in easier but provides insufficient support when getting out.

The bathroom floor should be checked carefully for suitability if a special bath is being considered.

Fitting a non-slip mat in the bath and teaching the person to turn on their hands and knees after draining the bath water may enable them to get out without further aids.

A combination of bath rails, bath board, bath seat and non-slip mat may assist many people who have difficulty getting into and out of the bath.

It is recommended that quarter turn lever taps may be the most suitable.

Ensure water pressure is reduced for safety.

Corner taps may be practical for some but if fitted on the outer side, may impede getting into and out of the bath. They are unsuitable if a plastic insert is used.

The tap closest to the bath edge must be the cold tap to help the blind and for the safety of children.

A walk-in bath may suit those who are liable to fall or are afraid of falling. It is particularly practical for institutional use and may prevent the attendants hurting their backs.

The bath can be used as a sit-in bath or as a shower cubicle. The user must be able to sit in the normal position. A water thermostat must be fitted to the taps.

The sensation of rising water may be frightening to some elderly or confused people.

An adjustable height bath is intended for use in hospital or in residential accommodation. It saves the attendant from unnecessary bending and may help prevent back strain.

An ambulant person can step into the bath at its lowest level and be raised to a convenient height for the helper bathing him.

A person who is unable to get into or out of the bath unaided should be hoisted using the particular model the bath was designed to accommodate.

A tilting bath may reduce the need for assistance and increase the independence of some people confined to a wheelchair.

A wheelchair user should check that he can transfer easily into and out of the tilting bath, using a transfer board if necessary.

If the user cannot close the door and operate the controls of the tilting bath a helper must be available to do so.

Check that the person is not likely to suffer dizziness when changing from horizontal to vertical.

Baths with built-in seats

The small square bath is designed to fit into a bathroom with limited space. It can be used as a shower area by a seated person. This bath is made from cast acrylic sheet and has a slip-resistant finish. A seat is built-in and handgrips are fitted on each side.

Bath inserts

A rigid insert may be more suitable than a bath board combined with bath seat if the person has great difficulty in getting out of an ordinary bath or lacks balance or co-ordination.

A bath board is useful for those with difficulty getting over the side of the bath, including those with lower limb disabilities, balance or co-ordination problems or stiff joints. The person sits on the board, feet outside the bath, slides backwards on the board, turns to swing the legs over into the bath and slides to the middle of the board.

A non-slip bath should always be used where available.

Those who lack limb strength or have poor balance may prefer to sit on the bath and use an over-bath shower. The curtain will need to hang outside the bath so suitable flooring is required with a drain gully in the floor.

A seat is useful for a person who is unable to sit in the bottom of a bath because of balance, mobility or lower limb problems; strong arms are needed to lower to the seat and onto the bottom of the bath. The seat can be used alone or in conjunction with a bath board. A bath rail may be necessary. The user can sit on the seat to bath or shower if he is unable to lower themselves into the bottom of the bath.

Some makes have mesh or slatted seats for water drainage. Only a seat which hangs from the bath rims or stands on the bottom of the bath is suitable in an acrylic bath.

Bath lifts

Some bath lifts can be operated independently by the bather, others are assistant-operated. Installing a lifting device may be more cost-effective than fitting a special bath or shower. Some are suitable for installing in small bathrooms and most can be re-sited if the person leaves the house.

The disabled person or assisting helper must have sufficient arm movement and strength to operate a mechanical device effectively.

Some lifting devices are simple to use. They are portable and can be used by community nurses to bath patients at home. They are unsuitable for those with poor balance; devices with rigid seats are safer.

If the device is operated electrically, a suitable power point will be required outside the bathroom. Those involved in using the device must be made fully aware of the safety factors recommended by the manufacturer.

Before a floor-fixed device is installed the floor should be checked for suitability. Periodically, the user or helper should check the device for stability.

Portable patient lifters can be used in the bathroom provided adequate manoeuvring space is available and there is space under the bath for the legs of the hoist. Alternatively, a base plate can be floor-fixed at the side or end of the bath and hoist mast fitted into it.

An electrically-operated hoist can be used in the bathroom; the ceiling joists must be inspected and their structural strength confirmed to ensure that they are adequate to carry the tracking. Slings used must allow the water to drain and it is recommended that a spare set be supplied to allow for drying.

Showering

Showers must be thermostatically controlled with maximum hot water outlet temperature of 35°C. Seek medical advice for each user's needs.

Discussion should be given to the choice between an over-bath shower and shower cubicle. Showering does not always overcome all problems of disabled bathers. Some, particularly the elderly disabled, dislike showers and prefer a strip-wash.

Grants may be available for part of the cost of installing a shower from Environmental Health Departments (for private housing) or the Local Authority (for council housing).

If new downstairs facilities are essential, consider the site of the shower with the WC and washbasin, allowing sufficient space for a wheelchair and a helper as necessary.

Heating, lighting and ventilation of the shower areas should be as detailed previously and the installation of an emergency call system is essential.

Shower trays designed for the disabled do not have a step-over ledge. Check the model and install a grabrail for safety by the entrance. A non-slip sloping floor area is much safer than a shower tray and it is essential for wheelchair use, though it is more expensive to install.

Sloping floors must be non-slip. Non-slip mats are dangerous in such areas. Adhesive safety treads can be used.

It may be difficult to install a sloping floor area in an upstairs bathroom.

The shower curtain or door should be easy for the disabled user to manage. Some magnetic door catches on cubicles require considerable dexterity. A shower curtain must hang inside the shower unit which reduces the area that can be used.

The shower mixing valve should have maximum temperature pre-set at 35°C and thermostatically controlled. This is especially important for those with sensory problems when the temperature must be pre-set lower to suit their medical needs. An anti-scald shut off device must be provided as an essential component.

An instantaneous electric heater must contain an anti-scald device to cope with variations in water pressure. There should be a visual method of checking the water temperature for those with sensory problems. The unit must be temperature pre-set to suit the user's medical needs. The temperature leaving the shower-head must not exceed 35°C.

The controls must be easy to operate and within safe reach of the user or helper. It is recommended that the shower be used for hair washing and conveniently sited for this application.

A shower head fitted to a flexible tube with wall-mountings at alternative heights or a shower head with a sliding bracket on a wall-mounted tube are recommended in preference to a fixed spray position. The installation of these types of showers must be in compliance with the Water Regulations, with regard to backflow.

A tray for soap and sponges should be accessible to the user.

Floor drain gratings should be flush with the floor. The grating material should be nickel bronze or stainless steel.

Bidets

A bidet is recommended for independent personal cleansing. The installation must conform to the Water Regulations.

The seat height of the bidet must be suitable for the disabled ambulant person; special models with a higher seat are available. Grabrails will be necessary.

For a wheelchair user, the seat height must be the same as the wheelchair seat. The user can sit facing forwards or backwards on the bidet as convenient. The hot water requirements must be as for 'Showering' section previously.

Urinals

Specially adapted wheelchairs, cushions or seat cushions may help those using urinals. Generally the wheelchair user will not be able to use wall hung or slab urinals.

Grabrails

Grabrails are fitted in the bathroom to provide support to the disabled user when washing at the basin, getting into and out of the bath and on and off the WC. They should be positioned so that the washbasin, toilet roll holder or towel rail are never used for support through habit or emergency.

Rails should be positioned to suit the individual. Standard layouts and combination may not be satisfactory.

Walls and partition walls must be of sufficient structural strength to support the load exerted on the rail. Reinforcement may be necessary.

Installation should be carried out by a qualified person.

Grabrails fitted in a bathroom or WC must have an anti-slip finish.

Flanged grabrails should be checked regularly to ensure that the hinge is in good working order.

Disposal of incontinence and sanitary towels

For reasons of hygiene and to prohibit the spread of disease by contamination, macerators or incinerators should be installed instead of bins. Maintenance personnel must be protected against contracting diseases; incinerators are therefore preferable. The use of macerators is only acceptable providing maintenance personnel are given training and protection against AIDS and other related diseases. Seek advice from Health and Safety at Work Commission.

Drainage

If no disposal unit is made available, the incontinence and sanitary towels will be placed into the WC Pan for disposal as no other facility is provided. This is not good practice. The designer should however design the drainage system to accommodate these items when the disposal units are not functioning.

All changes of direction must be designed with long radius easy bends and sufficient access points, readily available in practical positions for use by maintenance personnel.

Ensure that drainage gradients are not minimum but generous for self-cleansing velocity of the solids from the drain. Before using dual water capacity flushing units, calculate the volume and discharge rates required to keep the drainage system from the toilet areas used by the disabled community clean of soiled items.

Joints

Ensure all joints are sealed with non-setting ceramic sealants.

Hot water and heating

Scope

NHS Estates Guidance Note DN4 gives information for all health care and personal social services premises, Registered Homes Act 1984 and non- registered premises such as sheltered accommodation. All commercial activity to private or public homes and domestic facilities within requirements for all patients, residents and visitors.

Requirement

All responsible persons including design staff, supervisors and contractors/ installers under the Health and Safety at Work (etc.) Act 1974 have a 'duty of care' and should be able to demonstrate that they are providing a safe environment. This requirement is equally applicable to new and existing premises.

Only where a resident or patient or user is under adequate continuous supervision may the use of low surface temperature radiators not be warranted. However what is adequate for one user may not be adequate for all. It is recommended for safety reasons that the whole installation works comply to the Guidance Note DN4.

Safe hot water temperature

Hot water distribution temperature will be in excess of 50°C for the control of Legionella. See the appropriate section for details.

Safe hot water temperature must not exceed 35°C. All outlets must be thermostatically controlled and blended to temperatures below 35°C to accommodate the user's medical needs.

Recommended ‘safe’ hot water terminal tap, shower, bidet temperature is 35°C. All thermostatically controlled mixers must be fail safe to BS 1415 Part 2 and must not allow hot water to flow in the event of failure.

Maintenance

It is essential to check the temperature settings and operation of all mixing devices at least half yearly. Other maintenance should be strictly in accordance with the manufacturers’ instructions.

The local water quality, especially if the ‘safe’ water is not treated, will influence the maintenance frequency. Small pieces of debris can fail the operation of the temperature control.

Space heating

Domestic hot water systems must not be used for space heating, towel rails, bed pan racks, etc.

Advanced WC cubicle design for wheelchair disabled

This uses the recommended guidelines for the size of the WC compartment and facilities. The WC compartment is illuminated by an automatic light incorporating an infra-red device which switches ‘on’ when a disabled person enters the room and only switches ‘off’ after the person has left the room.

The tap and hand dryer are operated by automatic sensors. The sanitary fittings are placed within easy reach of the disabled person whilst they are seated on the WC Pan.

Support rails of the standard size are placed in the positions shown in Figure 4. The whole cubicle has a failsafe mechanism.

Facilities should not be institutional looking. They should be well designed with good quality products and user friendly. The designer should use a wheelchair to gain experience for the user’s needs. Everyone is unique and a person.

Central heating for the disabled

Care must be exercised when designing and installing heating systems for the disabled to ensure that all components requiring adjustment or attention by the disabled user are accessible and safe to operate without risk to the disabled person or their attendants. All components must be selected and designed to ensure that no injury or harm can result to the disabled user during normal use or due to possible foreseeable accidents. The following represent the main criteria to consider.

Living environment

Special consideration may be required with regard to the design internal temperature. This is particularly important for those users who do not move frequently and would therefore require a warmer environment. Each installation must be considered individually to determine the required temperature for the user. In some instances, higher than standard design ventilation rates will be required, these could be provided either by natural ventilation, i.e., openable windows or mechanical ventilation. In those instances, the additional heat load must be included within the design of the heating system.

The standard design heating flow and return temperatures of around 82°C and 71 °C has to be used with convectors or low surface temperature radiators. If water temperatures are decreased it is imperative that heat output from the emitters are corrected. It will also be necessary to conceal or guard pipework to protect the user from the possibility of burns.

All bare radiators and pipework, and controls within areas of use by disabled and elderly persons must be screen guarded to comply with Statutory requirements, low surface temperature radiators being the exception.

The system should be designed to ensure that all air and hydrogen dispels naturally through the open vent to avoid the necessity to vent radiators. Correct pipework gradients are therefore essential.

Boilers

Boilers should be fully automatic in operation, requiring the minimum of adjustment by the user. They should be situated to ensure that all controls or components requiring adjustment or attention by the user are at such a height to facilitate easy access and that no obstructions, such as return edges of walls or kitchen cabinets, are placed close to the boiler to restrict or prevent the user gaining access to the controls. Doors or flaps concealing the controls must be provided with an adequate method to enable the user to open and close them easily. Control knobs and levers must be smooth in operation and of a design to enable the user to operate them easily. The controls must be so situated to ensure that the user could not be injured from the hot surfaces in the boiler. Boilers with sharp edges must be avoided.

Solid fuel

It is recommended that where possible, solid fuel boilers should not be provided for disabled users. They must only be considered when the user would be capable of transferring fuel, removing ashes, lighting and stoking the fire. The associated dangers of this type of boiler must not be overlooked, particularly the necessity of the user coming into close contact with flames, heat and hot fuel and ashes. Where solid fuel boilers are used it is recommended that the fuel feed should be hopper fed requiring the minimum of attention. The bunker itself may require special consideration to ensure that the fuel can be readily racked to the outlet; it may be necessary to raise the bunker to provide adequate access. Consideration should be given to providing a method of ash removal direct to outside so that it is not necessary for the user to carry hot ashes through the premises.

Gas/oil fired

These are generally more reliable, require less attention and are easier to operate than solid fuel boilers. The ignition system should be of the fully automatic self-igniting type to avoid the necessity of re-lighting the pilot in the event of failure. If this cannot be provided than a pilot having piezo or electronic ignition should be used. Pilots requiring manual ignition by flame should be avoided. The fuel can be oil, natural or liquid petroleum gas. If banks of liquid petroleum gas bottles are provided having standby or changeover provision , the valving arrangement must be readily accessible and easily operated by the user. The main isolating gas or oil cock must also be readily accessible for use in an emergency.

Off-peak electric storage heaters

Off-peak electric heating is probably the safest and most easily operated method of heating for the severely disabled user. The cost of off-peak electricity may be more expensive than other fuels but the installation and maintenance costs are generally much lower for storage heaters than other forms of heating. All these factors must be taken into consideration to justify the installation if safety is not the prime consideration. The control of heat output from storage heaters is not as precise as other methods of heating and may cause overheating or underheating at times, particularly during autumn and spring when external temperatures vary considerably from day to day.

Automatic controls

The automatic control system should be simple to operate and reliable in service. Room thermostats and thermostatic radiator valves should be selected with a method of adjustment that can be readily altered by the user. Special consideration may be necessary with regard to the mounting height and position of the thermostat. The temperature range of the thermostat must be adequate to ensure that a comfortable environment can be maintained. This is particularly important for those users who do not move frequently and therefore require a higher room temperature. The user would not normally adjust the domestic hot water cylinder thermostat and therefore no special provisions are required. The initial setting of the cylinder thermostat must receive special consideration to ensure that the stored water is maintained at a temperature to protect the user from legionella. The safe hot water temperature at the outlet of the fitting must be thermostatically controlled and blended not to exceed 35°C and incorporating an anti-scald device that will not cause harm to the user, particularly those who do not have complete sensitivity to heat.
Consideration should be given to using digital time switches which many users would find easier to adjust than the electro-mechanical type.

Heat emitters

Consideration must be given to selecting low surface temperature radiators and other suitable heat emitters without sharp edges or protrusions on which the user could be injured due to the accidental knock or fall. The protrusions could include radiator valves, air vent and plugged connections. Radiators and convectors are available with the facility to conceal angle valves or with bottom or side connections which could be used in conjunction with straight valves. Alternatively, some users would find top and bottom opposite end connections more desirable with the isolating valve or thermostatic valve at the top connection to prevent the necessity to bend down for adjustment. The radiator valves used should have an easy and smooth action to enable the user to isolate the radiator if required. The heat emitters used should be designed so that there are no surface hot spots together with no access holes which allow small hands to enter, that is they should be totally enclosed.

Where it is known that the occupant will require the aid of a wheelchair, it is essential to ensure that the heat emitters and pipework are installed in such a manner that damage is unlikely to result to the services in the event of an accidental collision. It may be necessary to provide a protective guard around the services.

Where possible, heat emitters should be positioned under windows to reduce cold down draughts and the cold radiant effect. Where this is not possible they should be installed adjacent to windows. Radiators should also be positioned adjacent to external doors to reduce the effect of cold draughts.

Carbon Monoxide gas alarms

In all living areas where gas, oil, wood, solid fuel, appliances and electric storage heaters are used, Carbon Monoxide (CO) gas alarms should be installed. The CO Alarms must be manufactured in compliance with BS 7860:1996. The height of the alarm must be slightly higher than the disabled persons head height. This position allows for the audible alarm to sound and the disabled person to evacuate the premises before their breathing zone becomes contaminated with CO gas.

It should be remembered that the CO alarm does not wholly protect people who are at special risk due to age, pregnancy or medical condition. Also, a CO alarm is not a substitute for a smoke alarm or a combustible gas detector.

The installation location must not be in line with external fresh air, however it must be heard within the sleeping areas. Additional alarms should be installed near fuel burning appliances and electric storage heaters. Do not conceal the alarm behind curtains, pictures, false ceilings or other obstructions.

Carbon Monoxide gas is colourless, odourless, has the same buoyancy as air and can kill!

References

The Building Regulations (Amendment) 1998 Part M (schedule 1) and the supporting Approved Document M: Access and facilities for disabled people: 1999 Edition.

BS 5588:Part 8:1988. Fire Precautions in the Design, Construction and Use of Buildings - Code of Practice for Means of Escape for Disabled People.

Spaces in the Home, Bathrooms and WCs. HMSO.

Existing buildings covered by:
Disabled Discrimination Act of 1995 (gives suppliers until 2005 to remove all physical barriers).

Disabled Living Foundation,
380-384 Harrow Road,
London W9 2HO.
Tel: 020 8289 6111.

Equipment for the Disabled,
Mary Marlborough Lodge,
Nuffield Orthopaedic Centre,
Headington,
Oxford OX3 7LD.
Tel: 01865 750103.

The Royal Association for Disability and Rehabilitation (RADAR),
25 Mortimer Street,
London W1N 8AB.
Tel: 020-7637 5400.

Access Committee for England,
35 Great Smith Street,
London SW1P 3BJ.
Tel: 020-7222 7980.

Centre for Accessible Environments,
Nutmeg House,
60 Gainsford Street,
London SE1 2NY.
Tel: 010-7357 8182.